TECHNOLOGY DEPT.

Telephone ENGINEER and MANAGEMENT

PUBLIC LIBRARY
DEC 31 1945
DETROIT

DECEMBER, 1945

featuring

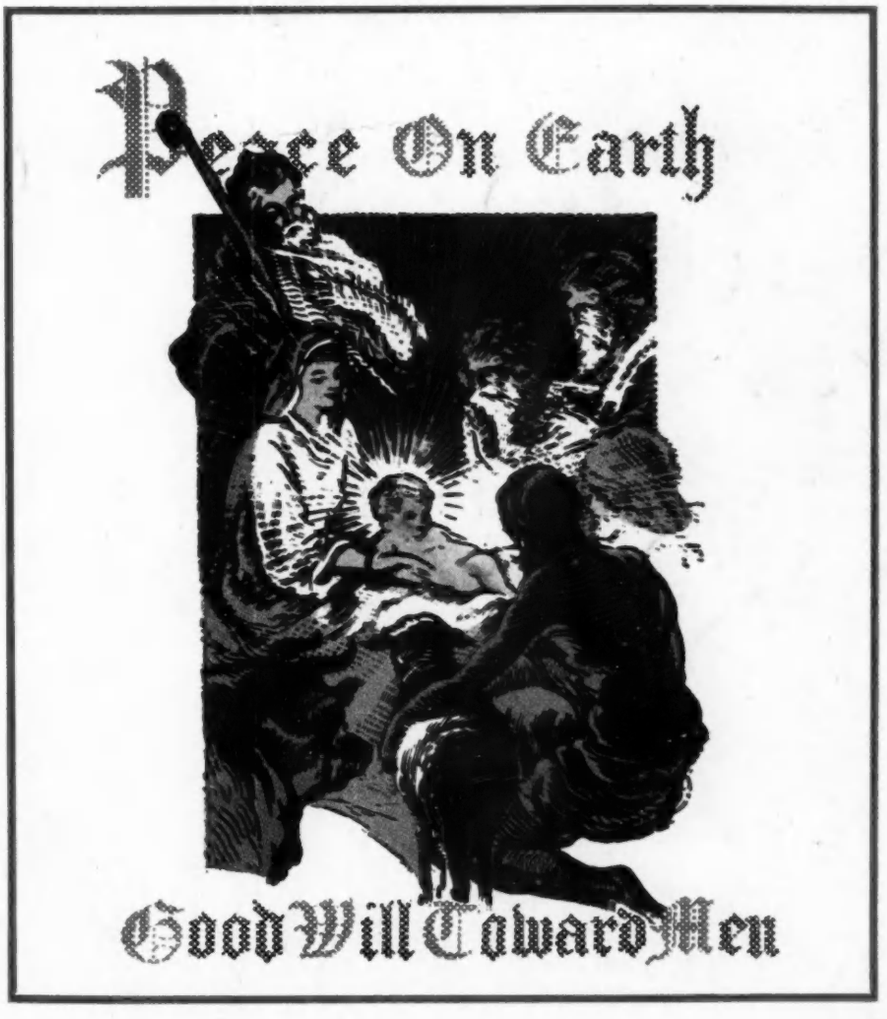
SOWING THE SEEDS
By
H. W. HOLMWOOD
Vice Pres., Assoc. Tel. Co.
Santa Monica, Cal.

Editorial Index on page 10

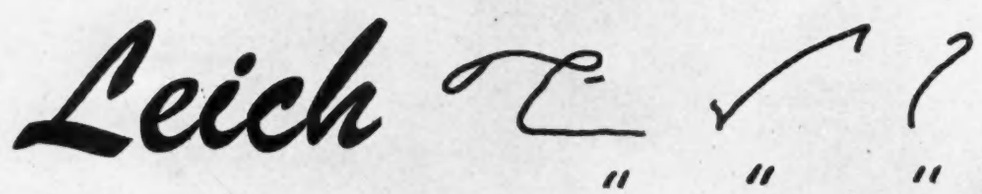
THE COVER PICTURE—

On this, our first peacetime Yuletide in five years, we give thanks for victory and say once more "Peace on earth: good will toward men."

VOLUME 49, NUMBER 12. Published monthly by Telephone Engineer Publishing Corporation. Office of Publication, Pontiac, Illinois. Executive and Editorial Office, 3720 Sheridan Road, Chicago, Illinois. Subscription: U. S., Cuba, Mexico, $1.50 per year; Canada $2.00, in all other countries, $3.50. Single copies, U.S.A. 15 cents; single copy JANUARY 15 BLUE BOOK BUYER'S GUIDE $1.00. Entered as second class matter at the post office at Pontiac, Illinois, under the act of March 3, 1879.

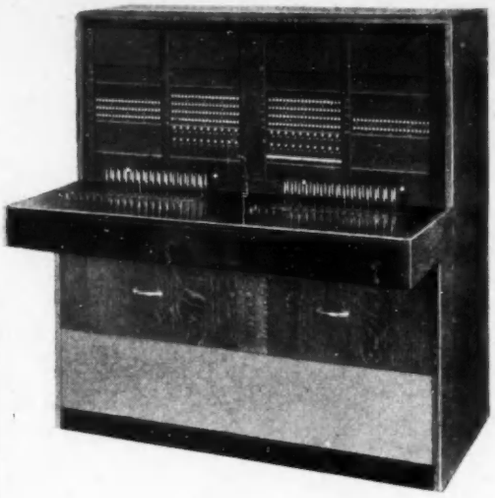


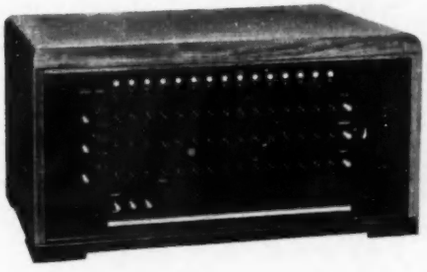
THE MAGAZINE OF THE TELEPHONE INDUSTRY

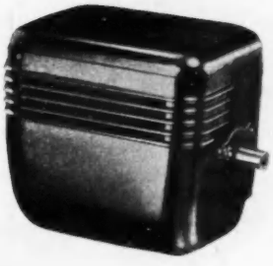


The above is merely a shorthand method of stating a fact proven by many long years of telephone operating company experience. It is "Leich Equipment Stands Up."

For specifications, prices and delivery schedules on Leich telephones and switchboards, address Leich Sales Corporation, 427 W. Randolph St., Chicago, Illinois.



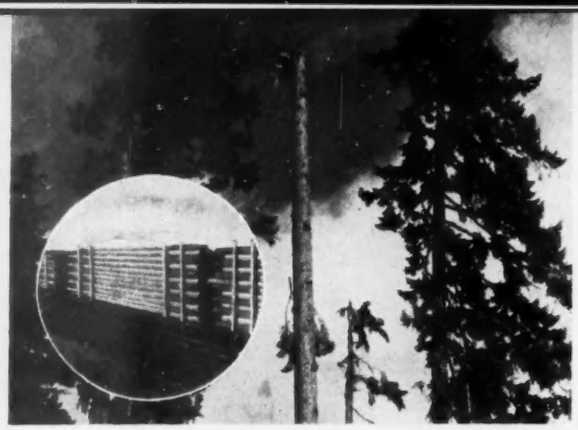




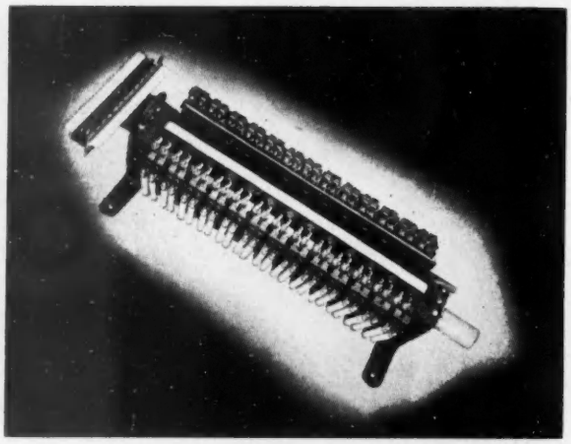
LEICH

MANUFACTURERS OF TELEPHONES, SWITCHBOARDS

AND RELATED APPARATUS SINCE 1907

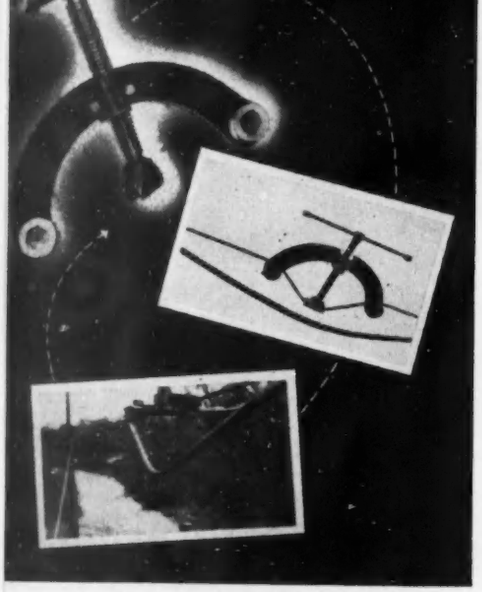


Topping a "Spar" Tree is one of the spectacular operations involved in logging selected trees to become MAC GILLIS & GIBBS CO.'s straight, sturdy Cedar Telephone Poles. Recommended by Kellogg, these poles are nationally famous for outstanding durability, strength, long service life.



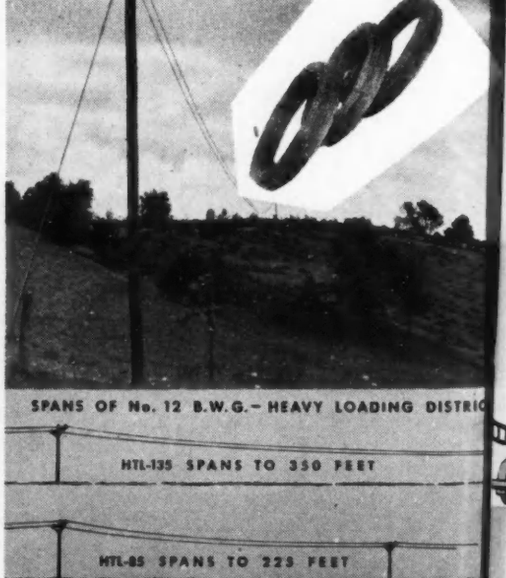
Efficient, Safe, Economical. The COOK ELECTRIC CO. "T" Main Distributing Frame provides direct termination of paper wrapped outside cable. Has terminal facilities for switchboard cable, with unit protector mounts containing primary and secondary lightning dischargers and fuses.

Simplify Guying and Save Guy Strand! Chance Thimbleye Guying Fixtures represent a way to do both. The curvature of the eye prevents kinking and breaking of strands, and helps make it easier to pull up and tighten guys. Chance Thimbleye Guying Fixtures . . . versus the old "wrap-around" method . . . save several feet of strand. Product of A. B. CHANCE COMPANY.



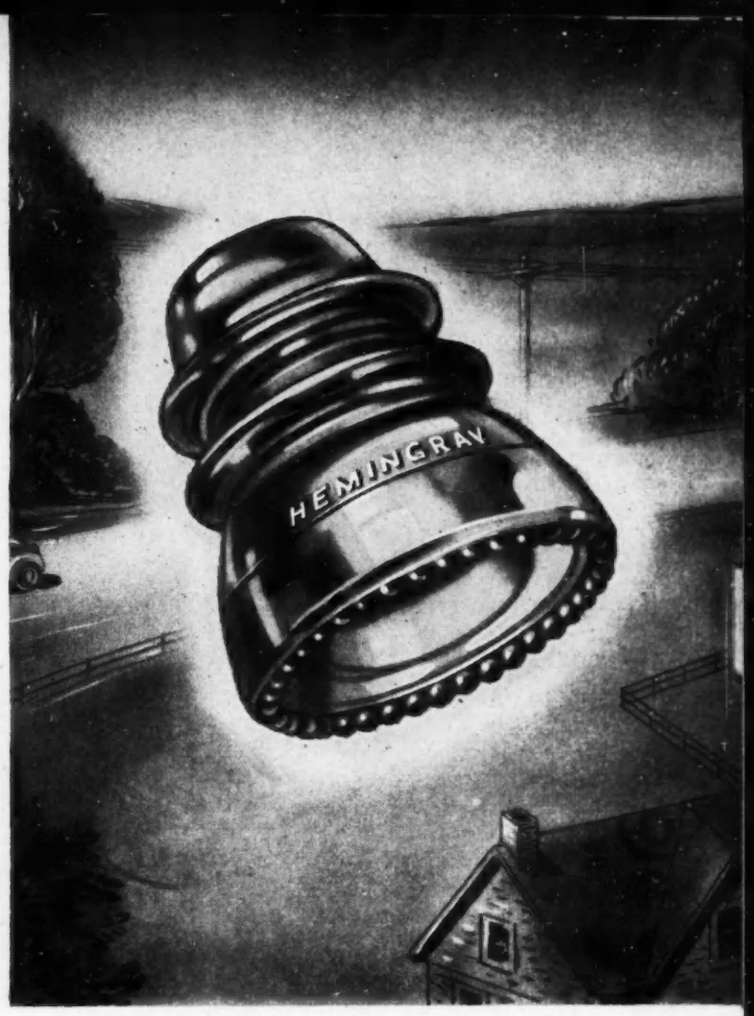
Time and Labor Saver. CABLE SPINNING EQUIPMENT CO.'S "Little Giant" Slack Puller is ideal for taking up and holding slack in spun messenger strand and cable before making cable repairs. A valuable time-saver, it cuts insulation damage caused by working on tight cables.

Not a Kink in a Carload. Kellogg Koiled Kords always stay out of the way, and thus they help reduce telephone breakage so often caused by dangling cords. The outer rubber cover is permanently molded in a spiral shape, thus assuring constant natural uniform retractability. An exclusive KELLOGG product.



Save Three Ways . . . on materials, man-hours, and maintenance, with INDIANA STEEL & WIRE COMPANY'S Crapo HTL-85 and Crapo HTL-135 Line Wire. Galvanized by the famous Crapo Galvanizing Process, it's protected with a heavy, ductile, tightly-adherent coating of zinc.

Modern Inside and Out! For the telephone industry's special needs, Philco provides a complete line of storage batteries ranging from 10 A. H. to 1680 A. H. capacity. Available in steel, glass, rubber and Vitrabloc jars, all incorporate the famous PHILCO Flotè element, which eliminates low cells in full float service, and has widely demonstrated its more efficient performance.



On Guard—In Any Weather! Hemingray Insulators stay on the job through rain, snow and summer heat. Made by OWENS-ILLINOIS GLASS CO., these *weather-proof* insulators are produced under exacting laboratory control. Every lot is checked hourly by precision instruments. Thus you can be sure every shipment is absolutely uniform. Hemingray No. 9 is shown above.

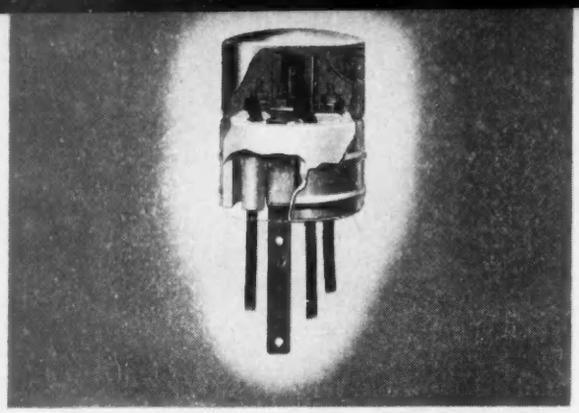
KELLOGG Recommends and Guarantees These Finer Supplies

. . . and that is your assurance that the line supply and construction materials shown here—all products of leading manufacturers—can be relied on for dependable service and lasting satisfaction. Like all line supplies listed and described in the Kellogg catalog, they are backed by the famous Kellogg "double guarantee." This is your best assurance of getting materials that will perform properly over a long period of time. Send your orders to . . .

KELLOGG SWITCHBOARD & SUPPLY COMPANY

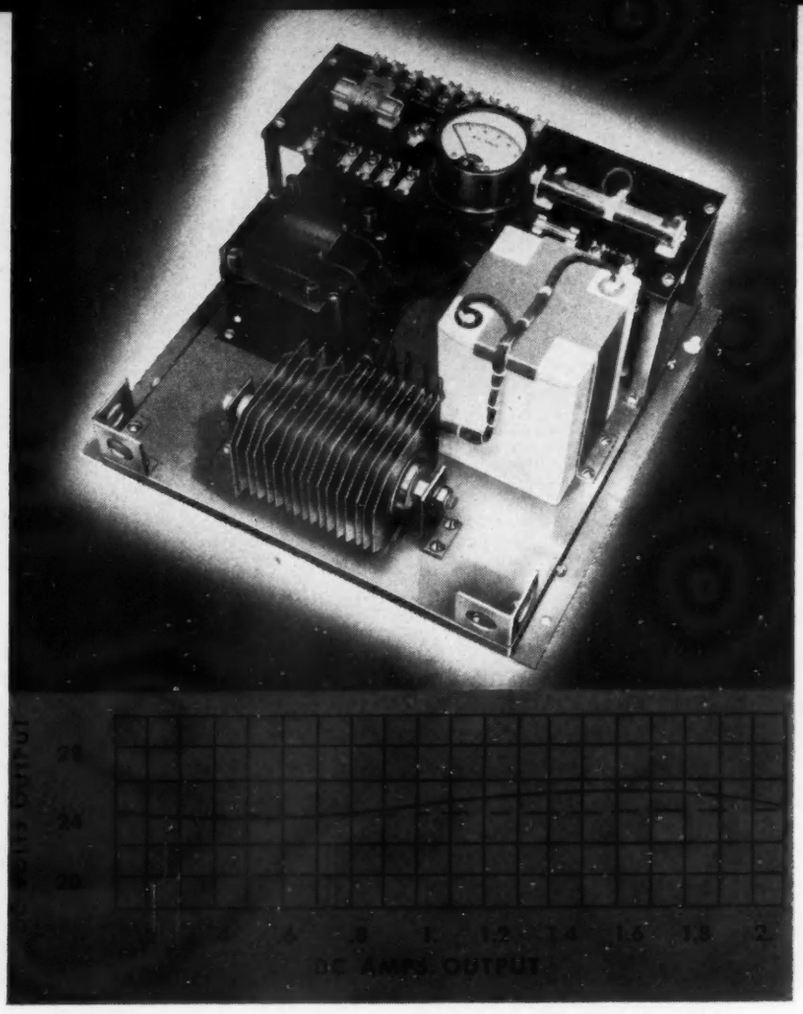
Factory and General Offices: 6650 South Cicero Avenue, Chicago 38, Illinois
Branch Offices: Kansas City San Francisco St. Paul Los Angeles

Order Your Line Supplies from KELLOGG



For Extreme Conditions. RELIABLE ELECTRIC CO.'S No. 402RR Dry Spot Lightning Arrester may be used on long communication lines which are connected to numerous stations without materially lowering insulation resistance. Truly economical, it operates under worst conditions.

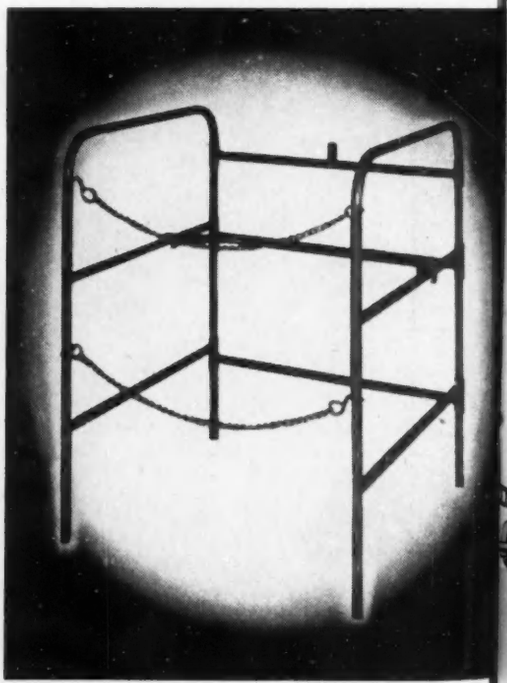
Durable and Silent. The Sub-Cycle Master Ringing Converter changes frequency *without moving parts*, thus reducing wear and consequent adjustment and maintenance. Made by LORAIN PRODUCTS CORP., this static-type frequency converter is available in several models.



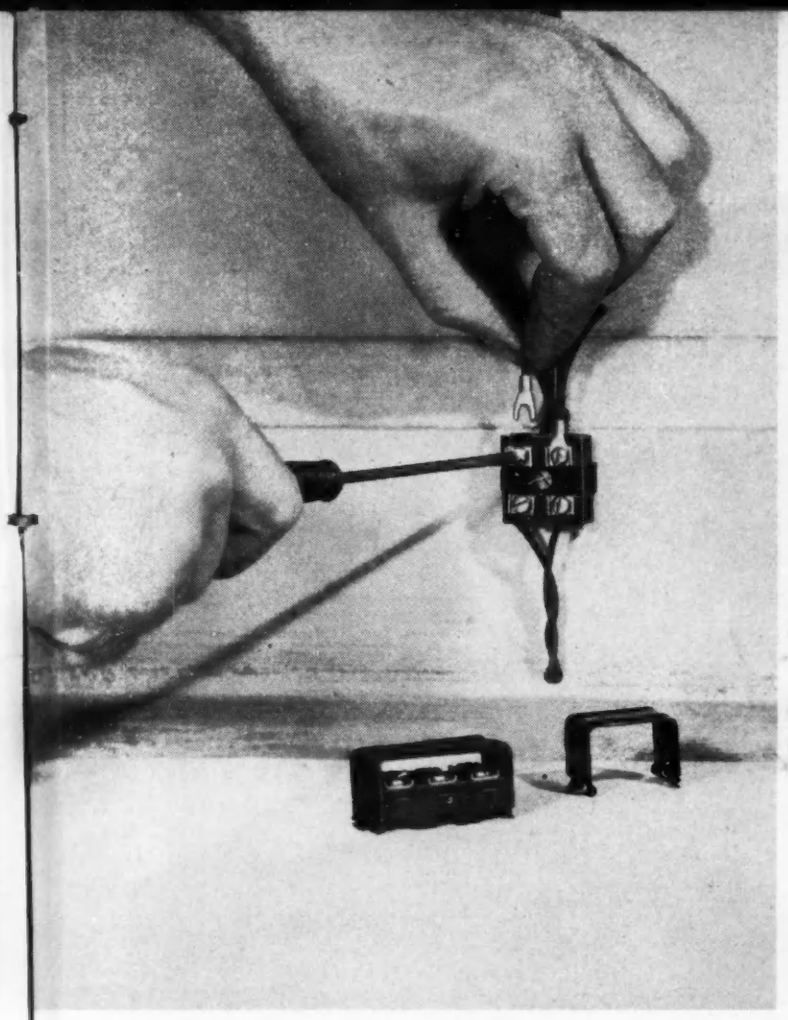
Steady DC Voltage required by switchboard lamps and telephones (especially dial) can always be assured with a RectiFilteR. Chart shows a typical curve of DC output voltage under varying loads, proving that this RAYTHEON MFG. CO unit provides stabilized output voltage regardless of AC variations. Because it has no moving parts subject to wear, maintenance is low.

Meet Every Service Need. That's why so many telephone companies use Armstrong's Whitall Tatum insulators, made by ARMSTRONG CORK COMPANY. Some of their outstanding features include crystal clarity of glass, accurate gaging, and unusual resistance to temperature changes.

Fast, Easy Cutting is assured when you use Newman Cutting Tools. The Newman Pole Tree Saw and the Curved Type Saw cut limbs smoothly and won't harm bark; the Hand Pruner makes full ¾" cuts with ease. Shipments can be made in two weeks or less. Made by NEWMAN MANUFACTURING AND SALES CO.



Safety is First in every piece of Cope Manhole Equipment. In this Type 264 Guard Rail, seamless steel tubing is used throughout for all sleeves and hinges. Completely welded for extra strength. The Wing Bow Brace in this T. J. COPE, INC. unit assures strong, rigid position.



Has All The Answers! Kellogg Connector Blocks have every feature needed to save installation time and assure fool-proof connections. U-shaped gripper plates are made to take spade or spike tips on any size wire. Block is shaped to hold tips in place without lateral movement. Other features: Bakelite base; corrosion-proof brass cover. It's available in 2 and 3-point sizes.

No More High Resistance Joints and intermittent open-and-closed circuits, when you use Kester Rosin-Core Solder! Kellogg and many other leading communication equipment manufacturers rely on this KESTER SOLDER CO. product exclusively because it seals joints permanently, helps protect them from expensive service troubles. Specify high-quality Kester Solder!

KELLOGG Recommends and Guarantees These Finer Supplies

. . . and that is your assurance that the line supply and construction materials shown here—all products of leading manufacturers—can be relied on for dependable service and lasting satisfaction. Like all line supplies listed and described in the Kellogg catalog, they are backed by the famous Kellogg "double guarantee." This is your best assurance of getting materials that will perform properly over a long period of time. Send your orders to . . .

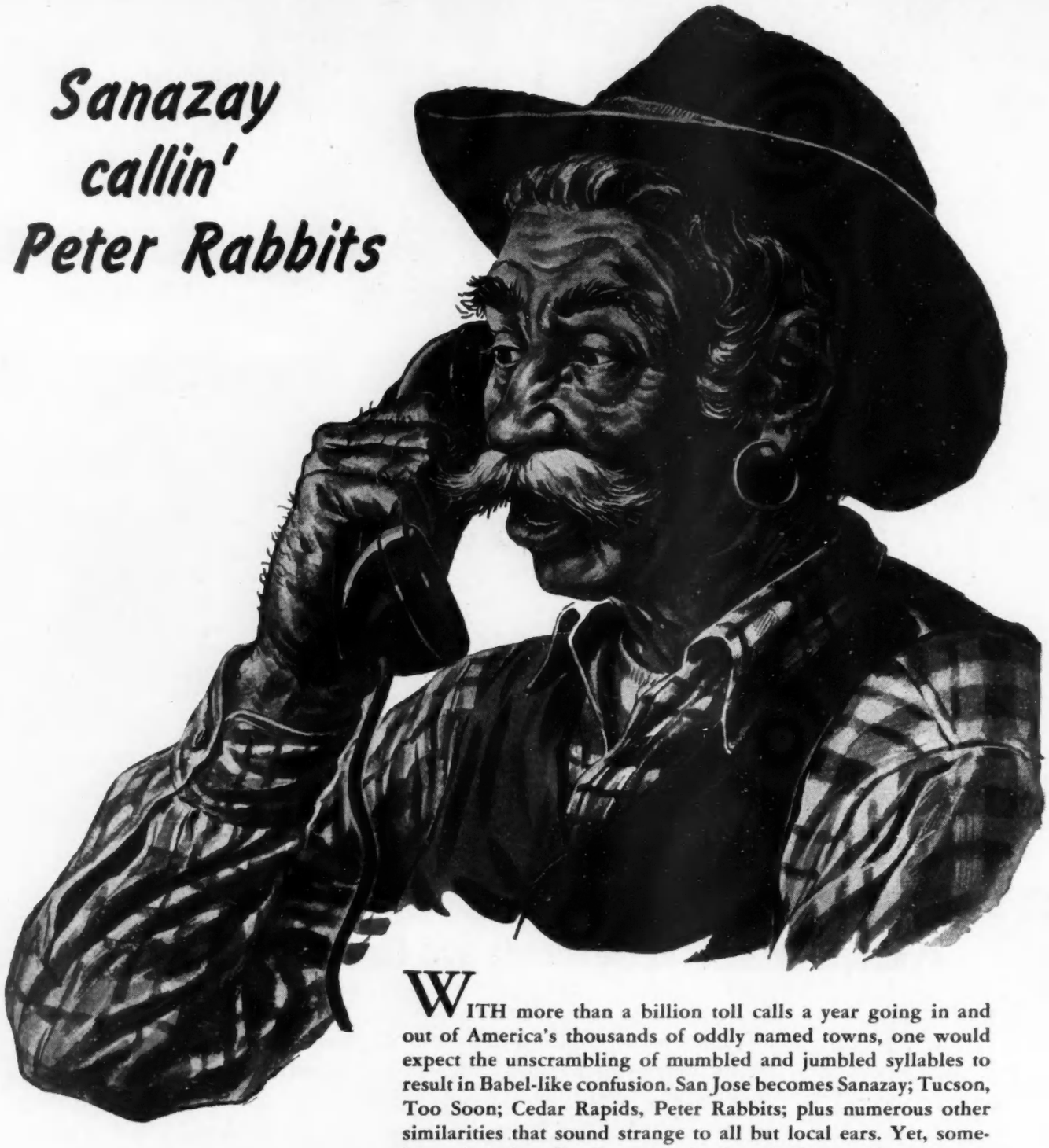
KELLOGG SWITCHBOARD & SUPPLY COMPANY

Factory and General Offices: 6650 South Cicero Avenue, Chicago 38, Illinois

Branch Offices: Kansas City San Francisco St. Paul Los Angeles

Order Your Line Supplies from KELLOGG

Sanazay callin' Peter Rabbits



WITH more than a billion toll calls a year going in and out of America's thousands of oddly named towns, one would expect the unscrambling of mumbled and jumbled syllables to result in Babel-like confusion. San Jose becomes Sanazay; Tucson, Too Soon; Cedar Rapids, Peter Rabbits; plus numerous other similarities that sound strange to all but local ears. Yet, somehow, the "decoding" experts in the telephone offices manage to keep the records straight.

"Keeping the records straight" is one of the many things that telephone workers do exceedingly well. Their consistent accuracy has won the public's confidence to a degree rarely equalled by "big business." It is an apt example of the application of the telephone tradition of faithfulness and dependability.

In Exide Batteries you will find the same dependability for which telephone service is famous throughout the world. Since 1895, Exides have been proving themselves worthy of that trust.

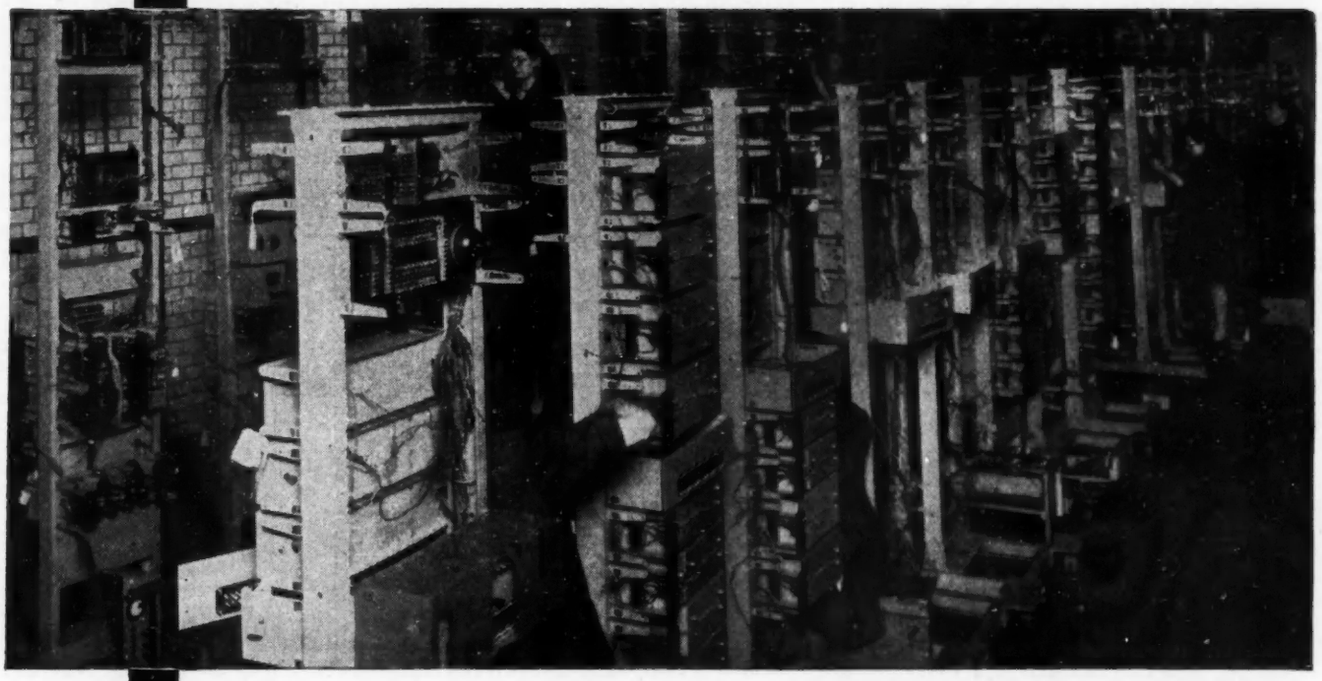
Exide
TELEPHONE BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32

Exide Batteries of Canada, Limited, Toronto

EXECUTIVES!

TELECOMMUNICATION ECONOMY WITH EFFICIENCY



The evergrowing demand for telecommunication facilities over increasingly greater distances has created the need for a more economic line transmission system without the sacrifice of efficiency.

Appreciating the universal advantages to be gained the highly-trained technical staffs of Automatic Telephone & Electric Co., Ltd. and Telephone Manufacturing Co. Ltd., have collaborated in the development of multi-channel line transmission systems.

These provide facilities for several simultaneous, independent and secret conversations over each pair of wires in a cable or overhead line network. Additional transmission channels can thus be provided as required and a greater volume of telephone or telegraph traffic handled without installation of expensive additional cable or open-wire circuits.

Our Technicians will gladly assist with detailed information on—

ATE/TMC **TELECOMMUNICATIONS TRANSMISSION EQUIPMENT**

MANUFACTURERS

Please address enquiries to:—

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.
STROWGER WORKS, LIVERPOOL
ENGLAND

TELEPHONE MANUFACTURING CO. LTD.
WEST DULWICH, LONDON, S.E.21
AND ST. MARY CRAY, KENT, ENGLAND

A802-A6

"It Seems to Us"

Theodore L. Hall, vice president of the Philippine Long Distance Telephone Company, has been in Chicago recently after being liberated from Santo Tomas prison Camp where he had been a prisoner 33 months. He seems to be regaining his health rapidly and will leave shortly to resume his duties in Manila. The Japs did a thorough job of wrecking the communications system in the Philippines.

•

Harlan Holmwood, vice president of Associated Telephone Company, Ltd. and during wartime a major in the U. S. Army, is making a name for himself as a writer in that company's magazine *The Circle*. An article written by him exclusively for this publication appears in this issue and carries a message for the executive as well as company employees.

•

"Doc" Rummel, the chap that handles telephone cable sales for John A. Roebling's Sons in Chicago, is a wounded veteran of World War II who has already made his mark in our industry. Doc was a Navy flier until a propeller severed his arm. To his credit we will say that this accident was just another incident in his life that has not bothered him or his activities. Do not get too big hearted with him on a golf course unless you want to lose a few chips.

•

The general public is certainly telephone-minded. *Time* reported on December 3 that a Mrs. Gresham of Memphis, Tennessee in suing for divorce, asked custody of the family telephone.

•

Roy W. Siemund, president of the Independent Pioneer Telephone Association and president of Leich Sales Corp., Chicago, is doing an outstanding job for the Pioneer association. Another state chapter will be announced soon together with an announcement that the membership of the Pioneers has grown steadily since Roy has been its chieftain.

TELEPHONE ENGINEER AND MANAGEMENT

Vol. 49, No. 12 **DECEMBER, 1945**

CONTENTS

- It Seems to Us 10
- Editorial—Year-End Balance Sheet 25
- News Briefs 26
- AN EXCLUSIVE FEATURE
  Sowing the Seeds—By Harlan W. Holmwood 27
- Alabama Convention Pictures 29
- Technical Developments in the Telephone Field
  Concluding Section—By B. C. Burden 30
- National and State Association News
  Georgia and South Carolina Meetings 34
- Coming Convention Dates 35
- The Observation Tower
  By the Observer and His Gang 36
- Personalities in the News 40
- Highlights of the Communication News
  By Roland C. Davies 44
- Walker Outlines Need for Regulatory Cooperation 48
- TELEPHONE ENGINEER's Radio Course
  for Telephone Men, Chapter 9, Section 2 56
- Line & Desk—Edited by J. S. Reed, Jr. 70
- TELEPHONE ENGINEER Handbook Tables 73
- Editorial Index, Jan.-Dec., 1945 76
- Classified Advertisements 80
- Index to Advertisers 82

RAY W. SMITH, Editor — ROY F. SMITH, Advertising Mgr.
DON C. SORENSEN, Promotion Mgr.
F. RATTENBURY, Associate Editor — EMILY RYKER, Circulation Mgr.
ROLAND C. DAVIES, VIRGINIA MICHAELS — Washington Bureau

Published Monthly by
Telephone Engineer Publishing Corporation

Copyright 1945 by Telephone Engineer Publ. Corp.

SERVING THE SIX BILLION DOLLAR TELEPHONE INDUSTRY

Founded in 1909

Office of Publication, Pontiac, Illinois. Executive and Editorial Offices 7720 Sheridan Road, Chicago 26 Illinois. Phone Rogers Park 3040. RAY W. SMITH, Editor: ROY F. SMITH, Adv. Manager, DON C. SORENSEN, Sales Prom. Mgr. Subscriptions: U. S., Cuba, Mexico $1.50 Per Year; Canada, $2.00; In all Other Countries, $3.50. Single copies, U.S.A., 15 cents. Single copy JANUARY 15 BLUE BOOK BUYER's GUIDE $1.00. All subscriptions should be sent DIRECT to 7720 Sheridan Rd. Chicago 26, Illinois.

TELEPHONE DIRECTORY
ADVERTISING HELPS:
The Public find who sells, Anything, Anywhere, Anytime.
The Advertisers secure more customers and get more profits.
Telephone Companies build up better public relations — Get more profits.
WE HELP THEM ALL BY DOING A GOOD DIRECTORY ADVERTISING SALES JOB
Our references: Any Telephone Company whose work we handle.
Telephone or write for proposition.
L. M. BERRY & CO.
Main Office: Telephone Bldg.
Dayton, Ohio
Selling Telephone Directory Advertising in over 3300 Cities and Towns in the United States and Canada.

Which Strand would YOU rather work with?

If you want to hear a lineman really moan, give him some strand that's stiff, hard to shape, and just plain cantankerous.

But watch what happens when he works with Bethlehem strand. He finds that it readily sets to shape, that it's uniform, easy to handle. The second reel is just as good as the first. And the third is just as good as the second. Crankiness simply doesn't exist in Bethlehem strand. Naturally, the stronger grades are stiffer than those of lower strength, but in every case Bethlehem gives you the *maximum* in flexibility.

This isn't a matter of "happenstance." It's achieved in the Bethlehem mills through a system of rigid controls, up-to-the-minute chemistry, expert metallurgy, and the finest wire-drawing technique. These factors, combined with the latest advances in stranding methods, assure you of a product that is uniform in quality—uniform in handleability—always easy to work with.

Bethlehem strand is available in all the standard grades, and of course every foot of it is armored by a bethanized coating of A, B, or C weight to protect against corrosion. Ask the nearest Bethlehem sales office or distributor for further details.

BETHLEHEM BETHANIZED STRAND

LET PHILCO HELP YOU MODERNIZE WITH MODERN FLOTÉ TELEPHONE BATTERIES

Yes, it's urgent that you get your expansion plans under way with all possible speed. And Philco is ready to help you with the famous Floté Storage Batteries that have *proved* their lower operating cost for many telephone companies. This modern telephone battery is the only battery with special engineering, special construction and special high-efficiency grid material for today's full float service. There is a Philco Floté Battery for every telephone need . . . in glass, rubber or vitrabloc jars. Write today for latest catalogs.

PHILCO CORPORATION
Storage Battery Division, Trenton 7, N. J.
Makers of the famous Philco "Thirty"

PHILCO

Famous for Quality the World Over

Tune in The Radio Hall of Fame, Paul Whiteman and His Orchestra, Sundays, 6 P.M., EST.

FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

Philco Floté Telephone Battery in enameled Steel Glass Jar.

The Facts About STROWGER AUTOMATIC and Automatic Toll Dialing

Strowger Automatic was the first type of automatic telephone switching equipment to be employed in any toll dialing network. The techniques developed by Automatic Electric engineers for such networks have long been in wide and successful use both in the United States and abroad.

In networks involving long distances and many tandem switching points, it is sometimes desirable to employ impulse registering and translating facilities, so that an operator can extend a call to a distant exchange by dialing the code number assigned to that exchange regardless of the number of tandem switching points through which the call must pass.

In the Strowger system such facilities are provided by the "Director," a simple combination of standard Strowger components which can be included in any initial installation or added at any later time, as needed. Strowger Director techniques were perfected long years ago. Standardized as far back as 1924, they are in extensive use today—in the London metropolitan area, and in other networks, both local and toll, in various other parts of the world.

In Strowger Automatic toll networks operating in limited areas, Director facilities are usually not provided, simply because they are not needed. This is in contrast to automatic systems in which register-translator facilities are an integral part of the switching mechanism and ***must*** be used whether or not the trunking conditions require them.

Strowger Automatic equipment is thus adapted to any automatic toll dialing network, whether it serves a limited area, or a nationwide area having a universal code numbering scheme for main and tributary switching points.

This flexibility of Strowger equipment for meeting toll dialing requirements is well known to competent and informed telephone engineers, and is here set forth for the information of non-technical telephone men who have the right to be correctly informed on modern toll dialing developments.

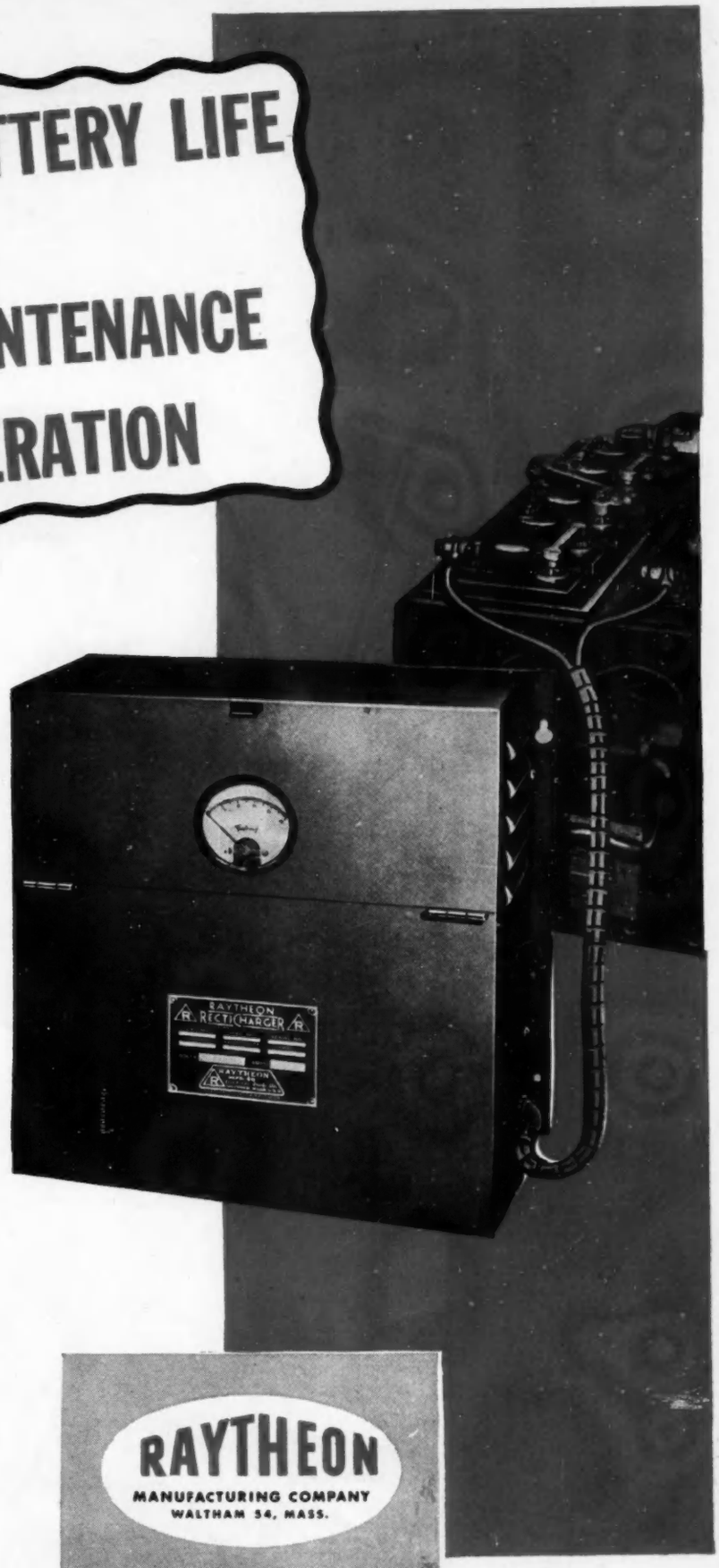
AUTOMATIC ELECTRIC

Originators and Developers of Strowger Step-by-Step Machine Switching Automatic Dial Systems
Makers of Telephone, Signaling and Communication Apparatus . . . Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions

AUTOMATIC ELECTRIC SALES CORPORATION, 1033 W. Van Buren St., Chicago 7, U. S. A.
Export Distributors: INTERNATIONAL AUTOMATIC ELECTRIC CORPORATION

• LENGTHEN BATTERY LIFE
• CUT BATTERY MAINTENANCE
• IMPROVE OPERATION



Install the RectiChargeR

Automatic Telephone Battery Charger. With a small storage battery across its terminals it is a *Complete AC to DC Telephone Power Unit.*

TELEPHONE operating companies, large and small, rely increasingly on the Raytheon RectiChargeR—in both attended and unattended exchanges—for the most difficult power jobs in the industry.

And with good reason!

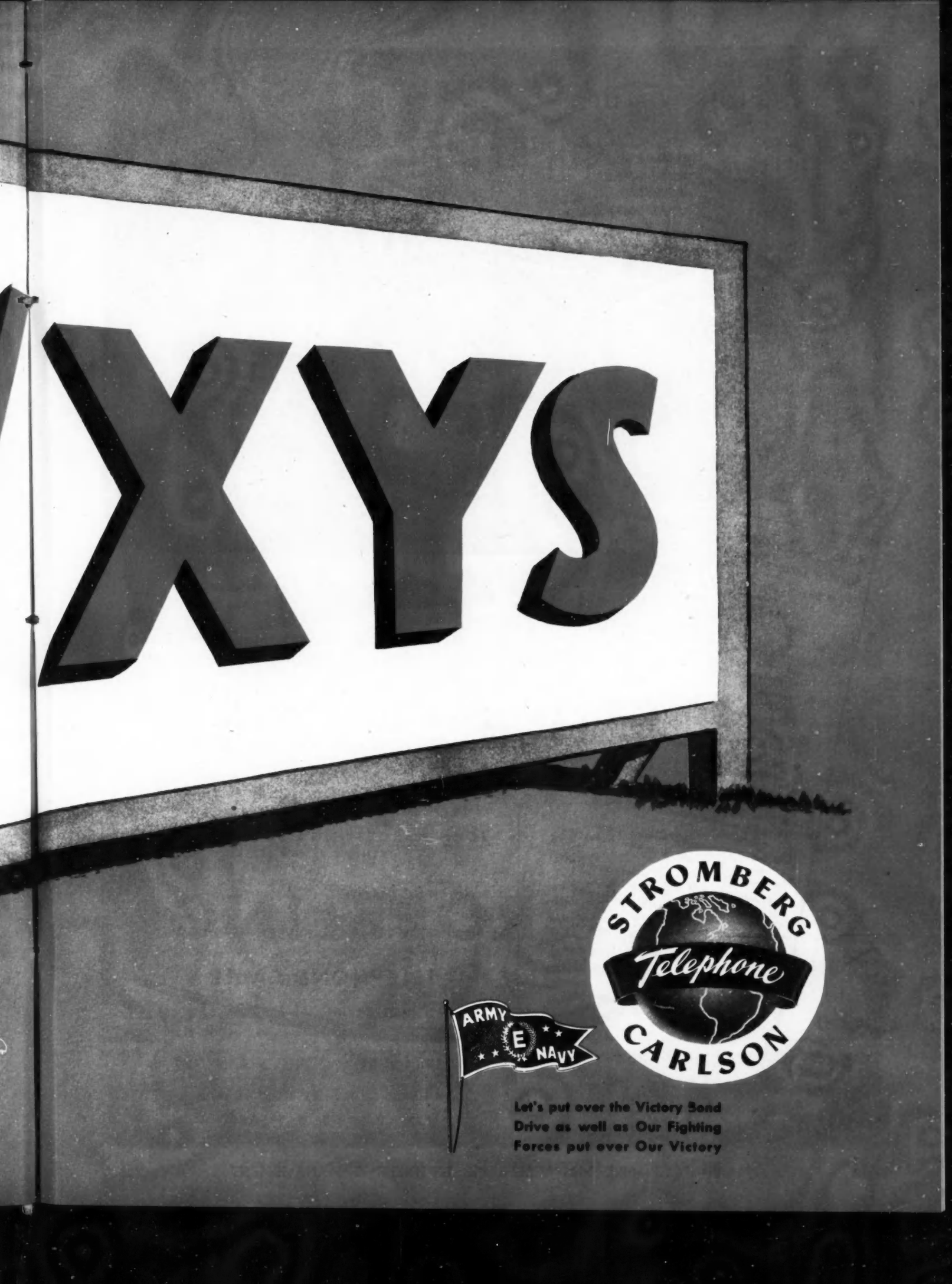
The constant-potential charging operation of the RectiChargeR lengthens battery life... The RectiChargeR cuts battery activity to a minimum because it carries the normal current demand... A variable control provides correct trickle rate... Fewer inspections are needed... Permits the economy of smaller batteries... The RectiChargeR is both an automatic DC output voltage stabilizer and a magnetic AC voltage stabilizer... It improves the operation of both manual and dial systems.

All the advantages of the Raytheon RectiChargeR are described and graphed in RectiChargeR Bulletin DL48-263B. Send for it today.

RAYTHEON
MANUFACTURING COMPANY
WALTHAM 54, MASS.

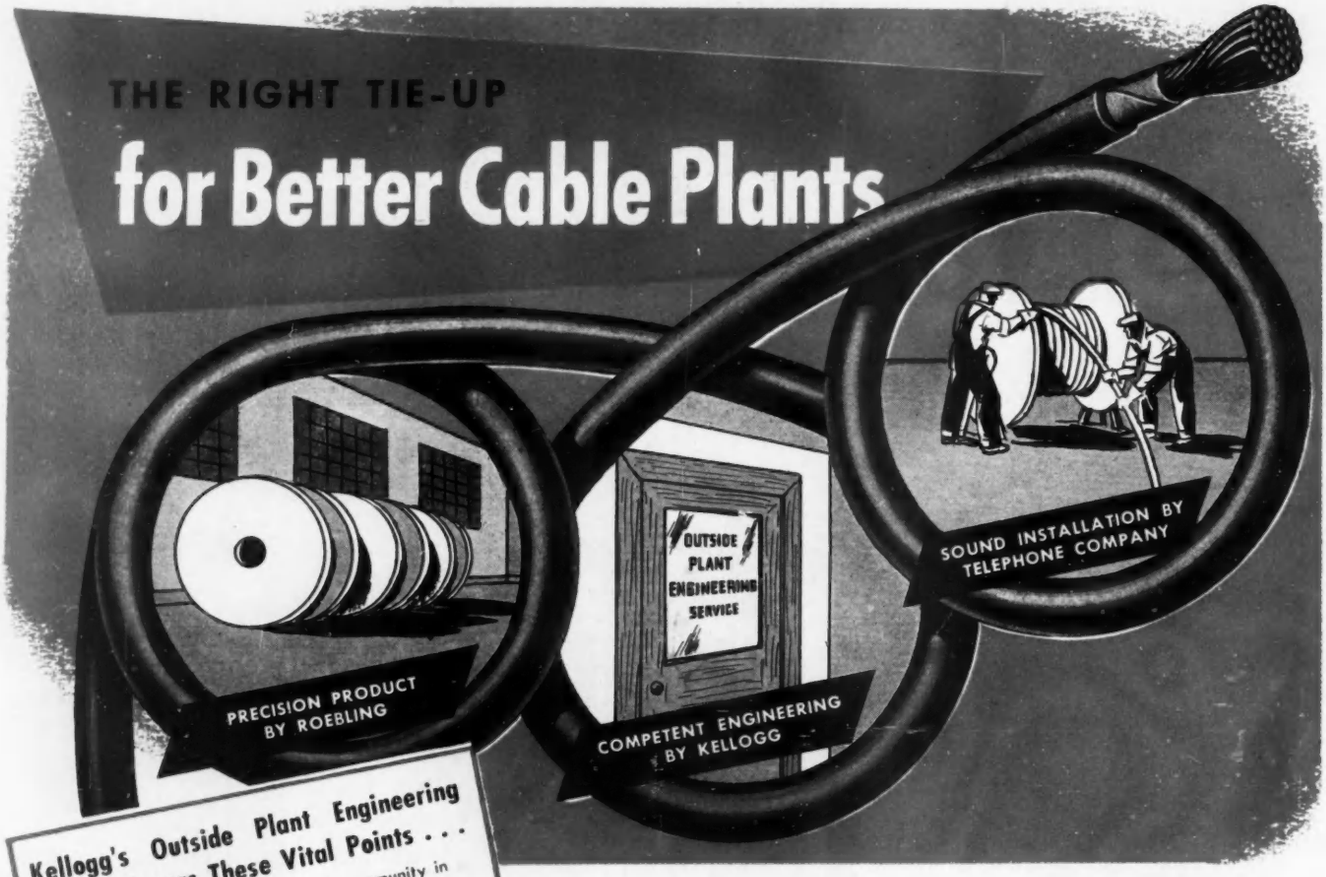
ELECTRICAL EQUIPMENT DIVISION
Excellence in Electronics

SC/


XYS
ARMY
E
NAVY
STROMBERG
Telephone
CARLSON
Let's put over the Victory Bond
Drive as well as Our Fighting
Forces put over Our Victory

THE RIGHT TIE-UP

for Better Cable Plants


OUTSIDE PLANT ENGINEERING SERVICE
PRECISION PRODUCT BY ROEBLING
COMPETENT ENGINEERING BY KELLOGG
SOUND INSTALLATION BY TELEPHONE COMPANY

Kellogg's Outside Plant Engineering Service Covers These Vital Points . . .

- Scientifically analyzing your community in relation to outside plant requirements to determine the practicability of open wire, aerial cable and underground cable.
- Laying out cable plants to assure adequate sizes and flexibility of cable pairs and to provide the most economical means to handle expansion.
- Rearranging cable and cable pairs to permit extensions and additions without sacrificing the existing plant.
- Analyzing right-of-way to determine the best routing at lowest practical cost.
- Recommending the most economical construction methods.
- Specifying proper and adequate termination and protection equipment.
- Providing for additions or replacements with a minimum disturbance of main cable splices.
- Observing electrical codes in locating cable so as to guard against power line hazards.
- Assuring cable plants of maximum standard transmission efficiency.
- Reducing your present maintenance expense of outside plant.

These are just a few of the many important considerations involved in engineering a sound, efficient cable system. For full details, check with Kellogg's Outside Plant Engineering Service.

Because the average cable installation is a long-term proposition, every cable job you do demands thorough checking, both as to the product and its installation.

As to cable—if it's "Roebling" you can have full confidence that it is "right" in every respect . . . the most dependable and most economical for the job . . . and backed by more than a hundred years' experience in specialized wire manufacture!

As to installation—you can insure the safety of your investment by checking your plans with Kellogg's Outside Plant Engineers. These specialists will engineer your system from beginning to end . . . assuring utmost transmission efficiency, most practical cable routes, economical extension possibilities and simplest maintenance. Take your problems or your plans to Kellogg, *without obligation*, and get the kind of assistance that will mean most to you.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY

ROEBLING

JR ROEBLING **TELEPHONE CABLE**

SINCE 1897 KELLOGG

Distributed by **KELLOGG**
SWITCHBOARD & SUPPLY CO.
6650 South Cicero Avenue, Chicago 38, Illinois

How to make OLD TRUCKS LOOK NEW

• Here's a way to make old trucks look new—quick. Drive them to your International Truck Branch or Dealer and say, "I want an Appearance Reconditioning Job done on these fellows."

And you'll get it, because sheet metal and other materials that were out because of the war, are back. You'll get perfect fitting new International fenders, radiator grilles, hood sheets, doors, glass, hardware, headlights, bumpers, bumper guards and seat cushions—just what you want to put your trucks in shape.

Next, paint jobs if the trucks need them—new paint to clean-up and brighten-up the whole trucks, and cause people to say, "There's one operator who certainly keeps his trucks looking swell."

The cost? Not great. The result? Marvelous.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

Act now. Truck production has increased, but it will take many years to meet the demand. Get your trucks "Appearance Reconditioned" by your International Truck Branch or Dealer. Make 'em good advertisements for you while you get additional economical miles from them.

Get These Too When You Get Your Trucks

"APPEARANCE RECONDITIONED"

• Hot Water Heaters and Defrosters • Seat Covers Elston Electric Road Sanders • Saf-T-Step • SOS Fire Guard • Whiz Automotive Chemicals • Spot Lights, Fog Lights and Driving Lights • Clearance Lights, Flags, Flares, Directional Signals and other Safety Devices.

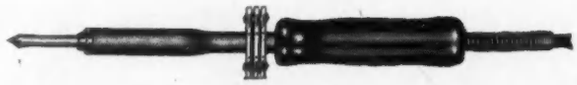
All available from your International Truck Branch or Dealer

INTERNATIONAL

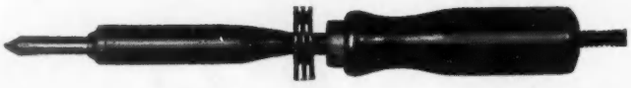
INTERNATIONAL *Trucks*

DRAKE — A NAME TO REMEMBER for RELIABLE SOLDERING EQUIPMENT

Through 25 years of soldering iron manufacturing, Drake has developed soldering products that set new high standards of quality and long-lived performance.



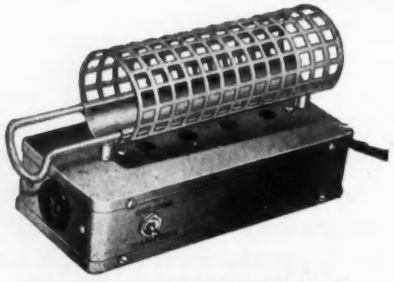
DRAKE No. 400, for example, is ideal for work in small places—weighs only 8 ounces and is only 9 inches long, yet it is a 60-watt iron.



DRAKE No. 600-10, is conservatively rated at 100 watts, but is only 10 inches long.

DRAKE SOLDER POTS

are available in 150 and 300 watt ratings to meet varying needs.



DRAKE HEAT CONTROL

is a fool-proof device for keeping idling irons ready for quick use.

GraybaR QUALITY SINCE 1869 * REG. U.S. PAT. OFF. — Distributed by GraybaR ELECTRIC COMPANY

The name DRAKE means utmost value—your assurance of long, economical usage.

DRAKE ELECTRIC WORKS, INC.
3656 LINCOLN AVE. CHICAGO 13, ILL.

You say, you don't know where to turn— to get the work done that you yearn— to do!

—

Tell us your troubles! and **who hasn't them?**

—

We will be glad to help you—

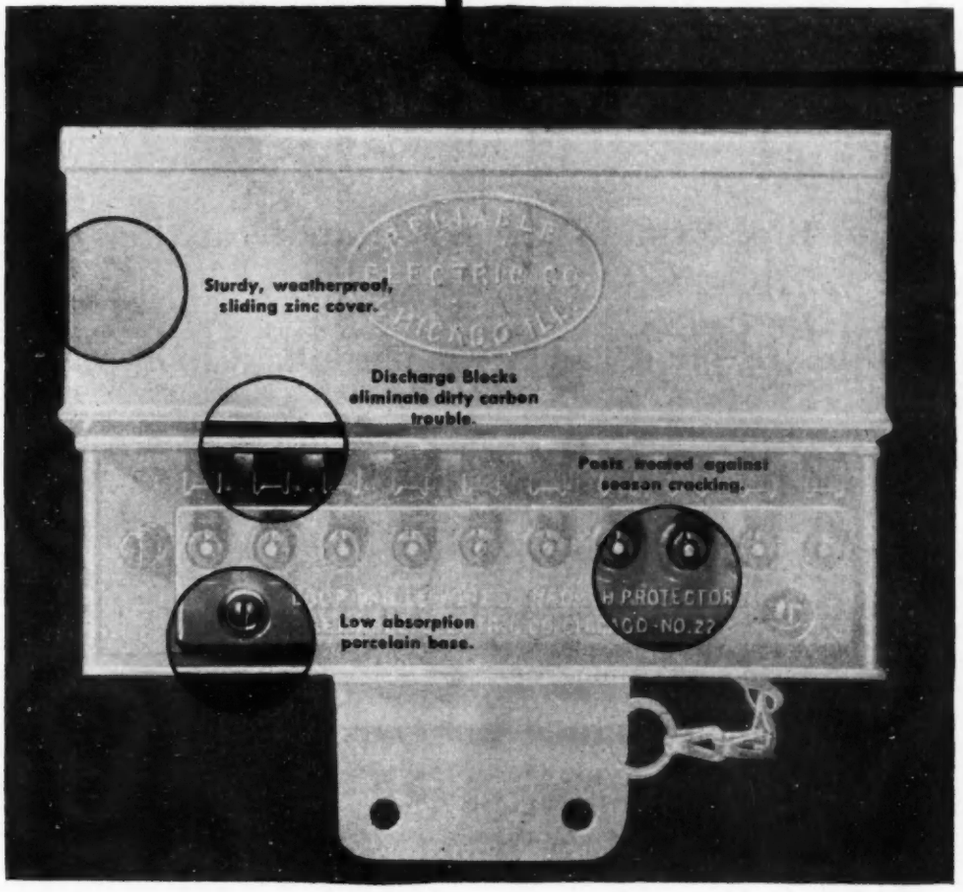
GUSTAV HIRSCH ORGANIZATION

310 WEST BROAD STREET
COLUMBUS 8, OHIO
Telephone—Main 6533

Construction and Engineering Specialists

"Reliable"

is the word for it!


Sturdy, weatherproof, sliding zinc cover.
Discharge Blocks eliminate dirty carbon trouble.
Posts treated against season cracking.
Low absorption porcelain base.

"—worthy of confidence; trustworthy"—says Webster, and what more could any user ask of any product. The Reliable 222 Outdoor Arrester is a very sensitive, yet rugged crossarm arrester with a ten-wire capacity. Mounted near terminals or along the line, the 222 Crossarm Arresters are of outstanding value where static is troublesome. Rugged, easy to install and thoroughly Reliable. Self-cleaning Sawtooth Discharge Blocks will protect without permanently grounding the line. Build for the future—specify "Reliable."

RELIABLE ELECTRIC COMPANY
3145 CARROLL AVENUE, CHICAGO 12, ILLINOIS

OVER 35 YEARS SERVICE TO THE TELEPHONE INDUSTRY

Timely Message on Holiday Calls

The Bell System advertisement on the opposite page carries a friendly Christmas spirit (and Christmas colors in some magazines). It is a reminder that Long Distance lines are still crowded. But its message is timely and important to the entire telephone industry.

An advertisement of the Bell Telephone System

IF IT'S LONG DISTANCE
ONLY NECESSARY CALLS, PLEASE
ON DEC. 24 AND DEC. 25
Thanks-and Happy Holidays
BELL TELEPHONE SYSTEM

Leich Switchboard Equipped With Model 6 Calculagraph. Photo courtesy Leich Sales Corporation, Chicago.

Calculagraphs continue, year after year, to be the accepted standard for measuring elapsed time of toll calls.

CALCULAGRAPH COMPANY

INCORPORATED 1892

310 SUSSEX STREET • HARRISON, NEW JERSEY

EDITORIAL

Year-End Balance Sheet

AT this time of year most of us are thinking more about our plans and programs for the new year soon to come, than about our successess and failures and mistakes of the year that is ending. It is a good thing that our time is divided into years—that we can mentally, at one time during every twelve months, wipe the old year off the slate and start out with fresh vigor on the new.

The telephone industry, like practically all industries, has gone through an abnormal number of changes of one kind or another during 1945. Most of these changes, fortunately, have come from problems of a wartime economy, and of the transition from war to a peacetime economy. We can hope that the experience we have gained in these matters will never have to be used again.

We face now the problems of what we hope will be a long-continued peace. They are problems, no less than those created by war. But they are a happier kind of problem, because when we solve them we are really getting somewhere.

There are plenty of problems that must be solved for the telephone industry before it can settle down again—if it ever does—to a status like that of the "good old days," when a telephone management could tell pretty well in advance, simply by studying its records of the past and projecting curves, about what the company would do in the way of station gain and profits during the next year.

One question revolves around the shift of population that is now beginning to take place. Will it mean net gain of stations, or net loss, at a given exchange?

Many telephone men are optimistic on this score. They think the trend of stations is upward almost everywhere—that the "telephone habit" has received a real boost during the war.

Another question is that of what will happen to the present high level of toll revenues. Will they go back to anything like the lower prewar level? Will they go back only part of that distance? Or will they go back at all?

Again, most telephone men seem to be optimistic. They think that people have become so accustomed to using "long distance" during the war that the habit will continue. Even the pessimists seem to anticipate only a moderate recession in toll revenues, and not even that until well into 1946.

Another problem is that of supplying facilities for all those who want telephone service, and of bringing plants up to customary standards. That problem, we think, will solve itself; it is a matter mostly of obtaining equipment, material and manpower. Those things are short right now, but they'll become plentiful very quickly when present large-scale labor difficulties are ironed out and telephone manufacturers can obtain raw materials that are now scarce largely because of those difficulties.

It looks to us like the telephone industry is getting rapidly to the place where it has the green light to go ahead under all steam. We think 1946 will be a very busy year for telephone people.

We of Telephone Engineer & Management have our own problems, of course. We also have our plans. Our plans are to continue the job, which we feel that we already have well under way, of making the Telephone Engineer publications the best telephone trade publications the telephone industry has ever had. We have a lot of things in mind, for 1946, in that respect—you'll be seeing the results of them in coming issues of our publications.

We think the year 1946 offers to all of us the opportunity for accomplishment and the promise of prosperity. It is on that note that we wish for all our readers, in this last issue of our publication for 1945, a Happy and Prosperous New Year!

NEWS Briefs...

Asks Rate Increase

The Milburn and Anselmo Telephone Company of Merna, Nebraska has petitioned its state commission for increased rates at the Anselmo, Brewster, Dunning and Merna exchanges, and the hearing has been set for December 19. The proposed rate is $2.25 per month.

Sale Authorized

The Mankato (Minnesota) Citizens Telephone Company received authorization November 28 from its state commission for the purchase of the property of the Riverside Rural Telephone Company, and upon consummation of the sale the rates of the Mankato company at its Eagle Lake rural exchange are to be effective in the territory now served by the Riverside Rural Telephone Company.

Reduce Line-Construction Costs

The New York Telephone Company and the larger Independent telephone companies in that state have joined in a move to make telephone service more readily available to farmers and other rural residents by including in the new rates filed on November 29 a reduction in telephone line-construction costs.

The main features of the new plan are a larger allowance in the amount of construction which will be built without charge, a decrease in the cost of construction exceeding the half-mile free allowance, and a monthly payment arrangement. It is estimated that under the new regulations only a very small percentage of rural applicants, possibly one out of twenty, may have to pay a construction charge.

Rate Increase Cases

Indiana companies that have recently petitioned their state Public Service Commission on rate increases and that are awaiting commission approval include the Darlington Telephone Company, New Paris Mutual Telephone Company, Providence Telephone Company and Odon-Madison Township Telephone Company.

Offer Surplus in Italy to Communications Industry

Officials of the Office of the Foreign Liquidation Commissioner have met with top representatives of the communications industry to offer them information on pertinent fixed communications installations in Italy in which the United States has an investment, and which have now been or may be declared surplus, Mr. Thomas B. McCabe, commissioner, announced December 4.

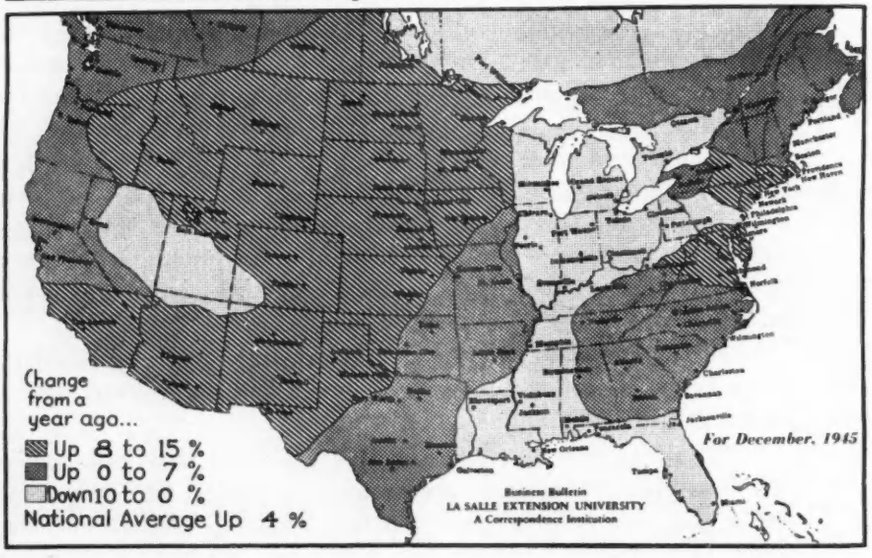
After introducing representatives of government agencies, who were present to advise industry of existing regulations, Colonel Sidney Gruneck, director, fixed installations division, who presided, explained that FLC desired to give the communications industry and other industries an opportunity to bid on surpluses before any bulk sales were made to foreign governments.

"These meetings are purely informatory and exploratory, to allow the industry to know in advance what we will have for sale and to offer an opportunity to submit bids," Colonel Gruneck emphasized.

Colonel Gruneck also pointed out to the communication officials that if they would submit lists of their needs by foreign countries, they would be forwarded to the field commissioners for immediate consideration. The industry was again reminded at the conference that, according to the Surplus Property Act of 1944, they could not import into this country for use here any surpluses purchased overseas.

Colonel Gruneck in his remarks stressed the fact that this type of meeting in no way voided the established FLC procedure that all business must be conducted through the FLC overseas field commissioner where the surplus is located.

LaSalle Map of Business Conditions


Change from a year ago...
Up 8 to 15 %
Up 0 to 7 %
Down 10 to 0 %
National Average Up 4 %
For December, 1945
Business Bulletin
LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution

The rate of business activity has risen a little in recent weeks, due more to increased holiday buying rather than to any changes in the volume of industrial production, according to La Salle's analysis. Conditions vary widely in different parts of the country and among various industries, but the general average is quite stable.

Sowing the SEEDS

By HARLAN W. HOLMWOOD, Vice President
Associated Telephone Company, Ltd.

OUT of the war have come many new economic and industrial activities, many new methods of making a living by the use of manual skill or mental talent, or of employing capital. Not all of these represent technological developments in the true sense, although the most spectacular, perhaps, are those activities and industries which have their roots in the scientific and mechanical marvels created by war's demands. Electronics, medicines, textiles, new machines for fabrication of metals, new chemical compounds, and new appliances of all sorts are among these interesting discoveries which characterize our new industrial ventures. Thousands of people, however, in varying degrees have acquired new trades or vocations not allied in any way with these mechanical advancements.

Keeping pace with the material developments have come some new concepts of personnel training and improved industrial utilization of hands and minds. Early in the war, the War Manpower Commission, recognizing the vital human factor in our country's industrial mobilization problem, established courses of training designed to improve supervisory functions, to increase factory output, and in general to lubricate the machinery of manpower functioning. Some of our telephone companies accepted the offer of the WMC and participated in the "Training Within Industry" programs. In general, workers and management entered into these programs with genuine interest and with appreciation of the need for improving our nation's industrial effort. Today many of the men and women who represented the WMC in the development and propagation of these training programs, being no longer on the Federal payroll, have set themselves up as training consultants, personnel advisors, or efficiency experts. Scarcely a week passes now that the mail does not bring us an offer from one of these agencies to remake our organization, to train our supervisors, or to handle our labor negotiations. This is not intended as any criticism of the earnest efforts and doubtless genuine offers of these counsellors, but merely as evidence of a line of endeavor which has come to be exploited extensively as a result of its prominence during the war.

Of almost equal prominence, perhaps even greater, is the vocation of public relations, if we are to judge from the announcements and invitations which come frequently in the mail. We are invited to join regional, state or national public relations counsels or forums, or to contract with some agency to equip our public with rose colored glasses when they look at the telephone company. Many of the people who were engaged in the work of molding public opinion to meet the psychological strains of war feel that they are prepared now to direct our customers' thoughts along the lines we should like them to follow. Again, this is not a criticism of another lucrative endeavor but merely a further step in the introduction to my article.

We are all very much impressed with the realization that our own part of the communications industry is going to be vitally affected by new technological features, the development of which was accelerated by the war. Our engineers and technical men are endeavoring to keep us well informed with respect to those matters so that we can be prepared to adopt them when they fit into our respective operations. What have we learned in recent years, however, that might possibly be put to good use in guiding us in matters of manpower utilization and public relations?

By the very nature of our business, public relations are with us always and constitute a factor which is never absent from our thoughts. The degree of attention which we give to our public relations, however, depends generally upon the immediately existing circumstances and the force with which they impress themselves upon our thoughts in relation to other considerations. To most

As vice president of Associated Tel. Co., Santa Monica, Cal., and in charge of public and personnel relations, Harlan W. Holmwood gives a great deal of thought to giving their employees an understanding of the company's goals and problems so that they in turn will use that information in their outside contacts and present a true and desirable picture to the public. Mr. Holmwood, a University of California graduate of 1924, and army major who served in Alaska and the Aleutians, has had a great deal of experience in telephone company matters which speaks for itself in the foresight he is using in their public relations' program for employees.

of us, run-of-the-mill public relations are comprised of our participation in service club activities, our contributions to local charities, and our newspaper advertising programs. Customers' complaints which reach us via the regulatory commission are investigated and reported upon at great length, and those which are lodged with us direct are handled with a degree of tact and dispatch which we have instilled in our respective departments. It is safe to say that in general telephone workers provide models of courtesy and consideration and the "voice with the smile" has become truly identified with our industry. Compliments from telephone users are printed in our company magazines or posted on bulletin boards for the edification of our personnel, and we measure our public relations by the tone and number of the complaints or the compliments.

There are occasions in the experience of every telephone company, however, when the true status of public relations is demonstrated in the concerted and united opinion of the people in a particular community, or perhaps throughout the company's territory, depending upon the radius and the nature of the factors operating at the particular moment. These occasions arise in general when the company

(a) is involved in a rate proceeding,
(b) is negotiating for a franchise,
(c) is affected by an emergency or a catastrophe of major proportions,
(d) is unable to furnish service because of a shortage of facilities, or,
(e) is furnishing a poor quality of service.

It is on these occasions that our long term public relations policies and activities are put to the real test. It is on these occasions that our neglect of the little things in life may rise to smite us between the eyes, or our attention to them may turn out like bread cast upon the waters.

The conditions listed as (d) and (e) above are in operation all over the nation today due to circumstances which need not be expounded upon here. Because of such conditions, public relations in many communities are approaching a "concerted and united" status. It is estimated that approximately two and one-half million people are asking "When can I have a telephone and why must I wait so long?" People who have service are asking "Why must I wait so long before your operator answers, and why do I get a busy signal so frequently when I am sure that the station I am calling is not busy?" In the face of the rising tide of these questions public relations are more important today than ever before because tomorrow many of us may be involved in rate proceedings if we are to keep pace with the rising costs of operation. Who is to answer these questions each time they are asked? Who should be prepared to spread the word of the company's position in anticipation of and during the rate proceedings? Should we depend upon the speeches which we make before service clubs, and on paid newspaper advertisements and bill inserts?

The bride is counselled that the shortest route to her man's heart is by way of his stomach. Are we not in the position where we should woo public patience and forbearance with respect to the present condition of our service and public sympathy for the future outlook for our earnings? What is the most direct approach for us to take in this wooing business?

Every man and woman who works for us has an opinion of his company and a voice with which he expresses that opinion frequently. Every day these men and women are meeting our customers and applicants for our service, either on the job or off the job in social or vocational activities. Why then, do we not make greater use of this channel for sowing the seeds of desirable public relations? How should we use it? By setting up definite standards of intra-organization relationships and by providing the members of our organization with the information they will need to represent us before the public. In short, perhaps, treat our workers like customers. Newspaper advertisements, letters and bill enclosures to customers and other media help, but there is nothing that accomplishes as much as an enthusiastic verbal explanation from a person who speaks from knowledge gained through direct association with the company.

Development of an operating force which will represent us properly before the public begins with our employment practices and with the manner in which we interview applicants for work. If our employment interviewer or the supervisor who has a vacancy to fill in his department treats the applicant in the manner in which we want our customers to be treated, the applicant's impression of our company will be determined accordingly. In short, we should treat the prospective worker as considerately as we expect him to treat our customers later. If we don't add him to our force, the applicant should leave our building thinking, "Well, I didn't get the job but they certainly were nice to me; it must be a fine place to work."

Personnel newly received into the Army is given a course of "orientation" and whether we employ that exact term or not, it refers to a training phase which we should not neglect in our business. Webster says that, among other things, to orient means "to set right by adjusting to facts or principles; to put into correct position or relation; to acquaint with the existing situation." It is difficult to find any term that describes more accurately the goal which we should attempt to reach in preparing our people to represent us before the public. In our case, however, orienta-

Telephone Engineer Photos

At the Alabama Telephone Association convention in Montgomery, November 19 and 20. In the top left picture from L to R: Miss Dorothy Fleming, Mrs. J. N. Cox, Jr., and Mrs. Earl McDonald. Top, right picture, from L to R: G. R. McKelvey, general manager of Standard Tel & Tel. Co., Dothan; A. N. (Al) Seward, who is vice president of the Florida Association and from Southeastern Tel. Co., Tallahassee, Fla.; and C. E. Kirk of Douglas. In the bottom picture at the left, L to R, were photographed Al Stratton, Automatic Electric Company, Atlanta, Ga.; F. E. Kirk, Dothan, Ala.; and H. W. Vaughn, president of Alabama Tel. Co., Fayette. In the bottom picture at the right Miss Myrtle Williams, who was in charge of the registration desk, checks the members and guests in while Earl McDonald of Alabama Tel. Co., who was reelected secretary-treasurer of the association, happened to stand nearby.

tion is not limited to the initial phase of the worker's training; it is a constant and recurring process because our workers should be made acquainted with changes of any sort which may affect the company's status in the eyes of the public. From the viewpoint of customer treatment, this matter of orientation is even more important than job training. Assuming that the worker has an interest in his job and is given a competent instructor, an apprentice craftsman or operator or clerk can learn to perform his work in a measurable period of time but his orientation requires attention throughout his employment.

Excepting only the quality and the extent of the mechanical service which we render, the public judges us entirely on the basis of the treatment it receives from the people who comprise our operating force. Throughout the pressure of the war years our operators and business office people maintained the high standards of courtesy, helpfulness and tact traditionally identified with our industry. Each of us has received numerous letters from telephone users complimenting us and expressing appreciation for such treatment in a period when customers' rights were being trampled upon elsewhere. The day has come, however, when we must arm the members of our respective operating forces with more than courtesy, helpfulness and tact. Today we must orient them to the existing situation and equip them to run interference for us while we carry the ball to the goal line of more and better service.

To furnish them with information regarding the business, many organizations, including some in our own industry, have observed the practice of distributing an annual report to their workers. In recent years there has been a widespread tendency to prepare stockholders' annual reports along simpler lines and in a form which might be understood by a reader other than the comptroller or treasurer. Consequently these reports have become more informative and less purely statistical and some organizations have chosen to include all of their employees in the distribution of the stockholders' annual reports. Recognizing that the employee's relationship to the company differs from that of the stockholder's, some managements have prepared special annual reports for their employees while at the same time making the stockholders' annual reports available to them if they desired to have them. When the management of a corporation makes an annual report to the stockholders, it is rendering an accounting of a stewardship to the owners of

(Please turn to page 72)

Conclusion

(Part 1 appeared in December 1, FORTNIGHTLY)

Technical DEVELOPMENTS in the Telephone Field

By B. C. BURDEN

Rural Radio Telephone Service

Radio channels appear particularly attractive as a means of serving farmers in areas in which subscriber density is low and the usual two wire lines cannot be economically justified. A radio channel reaching out 8 to 15 miles to a rural subscriber as shown in Fig. 8 saves miles of pole line and eliminates tree trimming costs and all the other headaches that go with rural service.

But before we can start taking down our poles and wire and putting up radio antennas we have several hurdles to clear.

For one thing the FCC has not yet indicated the extent to which it will permit radio channels to be used in lieu of rural subscriber wire lines. In fact it has stated that it will require that a proper showing of need, convenience and necessity, etc., be made before any licenses will be forthcoming. However, it can be anticipated that the Commission will not be unmindful of the value of radio channels for rural subscriber service and will give us a chance to take

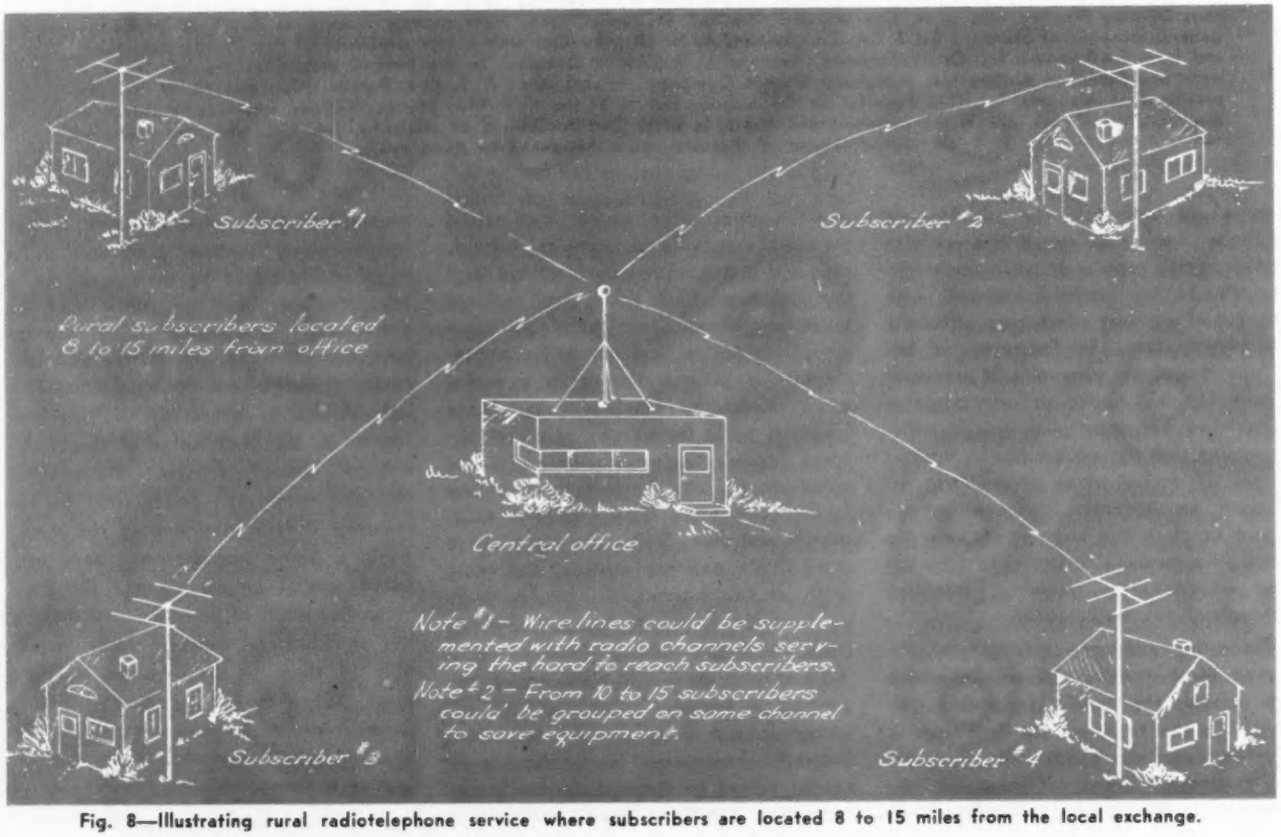

Subscriber #1
Subscriber #2
Rural subscribers located 8 to 15 miles from office
Central office
Note #1 – Wire lines could be supplemented with radio channels serving the hard to reach subscribers.
Note #2 – From 10 to 15 subscribers could be grouped on some channel to save equipment.
Subscriber #3
Subscriber #4

Fig. 8—Illustrating rural radiotelephone service where subscribers are located 8 to 15 miles from the local exchange.

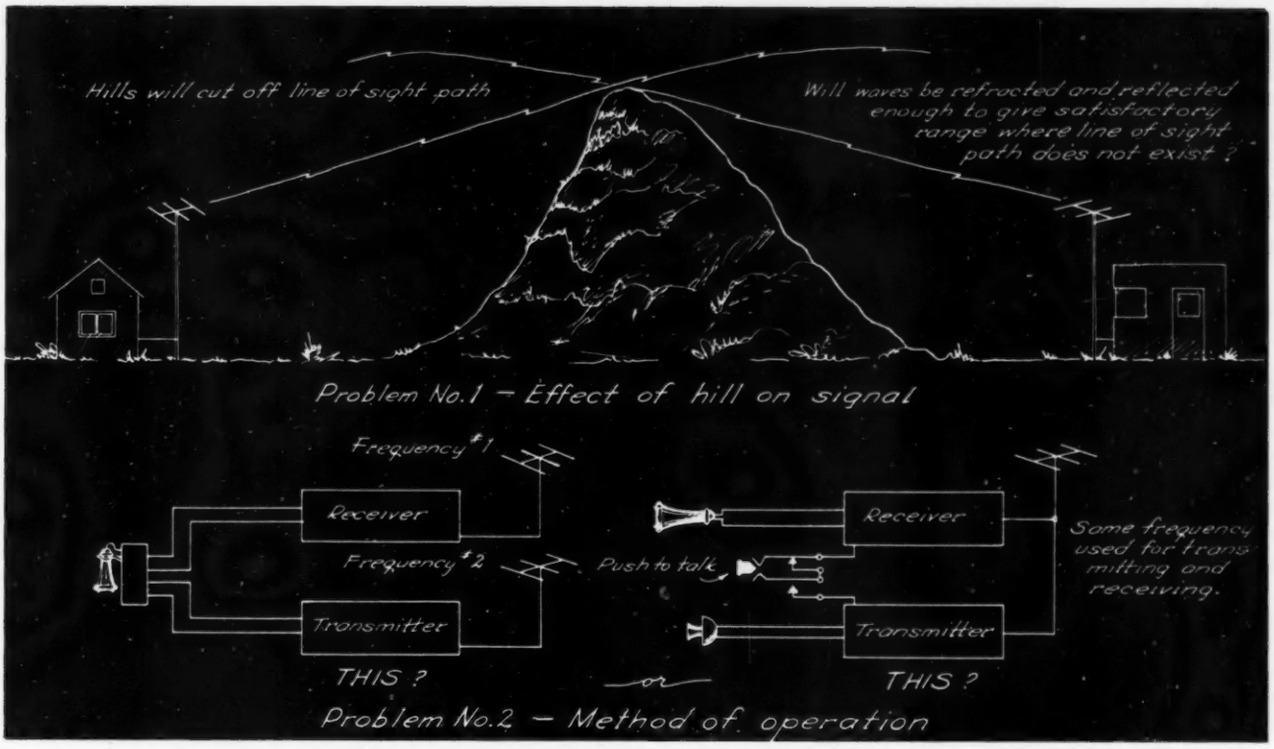

Hills will cut off line of sight path
Will waves be refracted and reflected enough to give satisfactory range where line of sight path does not exist ?
Problem No.1 – Effect of hill on signal
Frequency #1
Receiver
Frequency #2
Transmitter
Push to talk
Receiver
Transmitter
Same frequency used for transmitting and receiving.
THIS ?
or
THIS ?
Problem No.2 – Method of operation

Fig. 9—Problems inherent to the use of radio in lieu of wire lines.

full advantage of the potentialities of this new tool.

I believe it highly desirable that one or two of the larger Independent operating companies in each state obtain an experimental license covering rural radio channels and promptly institute a research program designed to develop the "know how" of rendering rural service via radio channels.

Your National Association spent considerable time and effort at the FCC allocation hearings presenting evidence of the need for frequencies. The Commission has recognized our potential uses of radio channels by giving them a classification in the final frequency allocation decision.

It is up to us to get busy and develop these new uses of radio. In the application of radio to rural subscriber service we have some technical problems ahead of us that must be solved. Fig. 9 illustrates a few of these basic problems.

One of the chief difficulties will be the matter of obtaining adequate signal strength when a line does not exist between the central office antenna and the rural station antenna. Will we be able to lay down a signal of adequate level to a farmer whose house is in a valley surrounded by hills? Can we use radio rural telephone to serve farmers who do not have commercial power? What type of antenna structures should be used? We can't answer these questions until we get some exprimental projects under way.

Short Haul Toll and Trunk Radio Channels

In my opinion one of the most promising applications of radio channels in the Independent field is for short haul toll and for special trunk circuits.

Radio channels operating at the frequencies earmarked for this service could be readily beamed from office to office and would offer a high quality short haul service with greatly reduced maintenance charges as compared to open wire lines.

The use of beamed radio channels should also prove useful and economical for special tie trunks between exchanges. Small dial exchanges or rural line concentration units could be linked to distant control offices as shown in Fig. 10.

Here again we must first justify our request for frequencies to the FCC before they will grant the necessary license. Equipment and techniques are available that would enable us to make full use of this new tool once we get busy and get the nod from the FCC to go ahead.

Mobile Radio Telephone Service

Radio offers the only practical means of serving telephone subscribers on wheels. The FCC has recognized the need for this type of service and has allocated frequencies for it. Whether or not mobile telephone service is rendered on a common carrier or a private basis depends in large part on the experimental showing which telephone companies (Bell

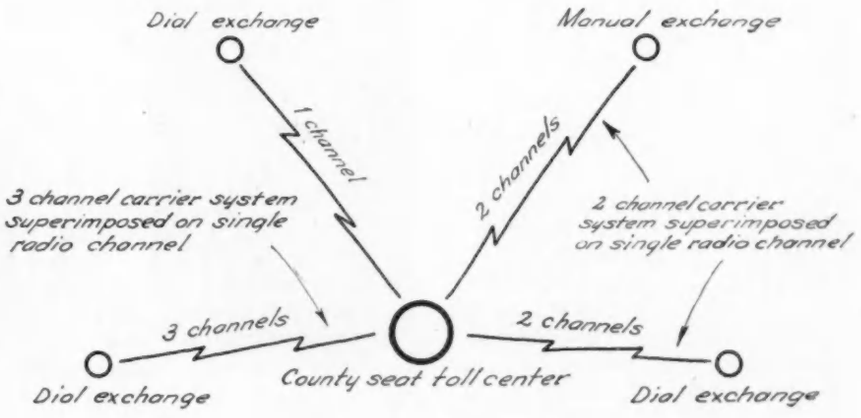


Fig. 10—Use of radio links between small dial exchanges and control offices.

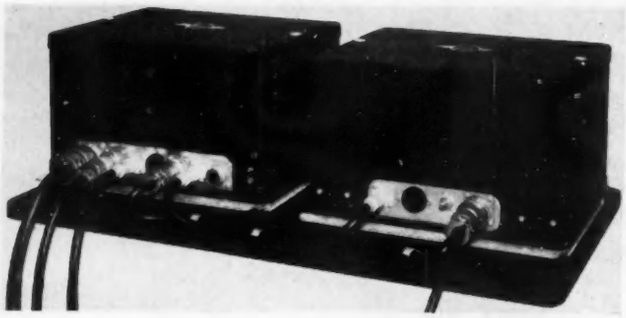


Fig. 11 — Transmitter and receiver for mobile installations. (Courtesy Link Radio Corp.)

and Independent) make in establishing this service. If you are operating in a city of appreciable size, you should consider the advisability of offering *urban radio-telephone mobile service.* If a preliminary survey indicates a demand for this service, apply to the FCC for an experimental license and set up a test project. The technical problems are somewhat less difficult than with rural radio service.

In the larger cities there is unquestionably a need for urban mobile radio telephone service to serve delivery trucks, doctors, busses, and many others. It would seem that this servivce can most efficiently be furnished by the telephone company.

But if telephone companies show no disposition to establish this service the FCC can be expected to license and encourage private parties to do so even though such arragement is admittedly a poor substitute for service on a common carrier basis.

At the present time the Commission is granting only experimental licenses in this field. A number of the associated Bell companies and one or two Independent companies have already applied for experimental licenses.

Radio Equipment

As far as I know, radio transmitting and receiving units especially designed for telephone field applications are not yet available.

However, suitable equipment based on designs for military use is or soon will be on the market. With some modification it can be used for the various telephone applications.

Through the courtesy of the Fred M. Link Company of New York, I am able to show you views of radio units of about the same type as will be used in telephone field applications.

Fig. 11 shows the transmitter and receiver unit designed for trunk mounting in mobile installations. These units have a power rating of 15 volts.

Equipment suitable for use at the central office end of a radio link is shown in Fig. 12. The unit shown has a power rating of 50 watts which should prove adequate for the average Independent exchange application.

Bell System companies proposing the establishment of urban mobile installations are thinking in terms of 20 watts of RF power at the central office and 15 watts in the mobile installation.

The unit shown in Fig. 13 was designed for and used extensively in the war. It operates in the frequency range 70 to 100 megacycles and is useful over 20 to 30 mile links.

These units in conjunction with special director-reflector type antennas were utilized either on a simplex or a duplex basis as shown.

The antenna system employed with these units would appear to have substantial advantage for such telephone applications as rural subscriber or short haul toll links. As shown in Fig. 14 it consists of a 40 foot steel pole on which are mounted three one-half wave elements. One acts as a director, one as a reflector and the one in the middle as a radiator. It has excellent directional properties and is easy to tune.

Lower Plant Cost Through Use of Motor Driven Tools

During the past year I have made several field trips with construction crews in an effort to uncover new and improved methods which would have the effect of either prolonging telephone plant life or reducing the labor-hour requirements for construction and maintenance operations.

There is one phase of our plant operation in which I see genuine opportunity for substantial economy of labor hours and energy. This is in connection with such operations as sawing, tree trimming, drilling, hole digging, etc. We are living in a motorized age. It is amazing that such a small object as a motor can have such an enormous capacity for doing work. For example, a ½ horsepower motor can do work at the rate of 16,500 foot pounds per minute. A 150 pound man climbing a 20 foot pole approximately seven times in one minute would just about equal the effort of this small motor.

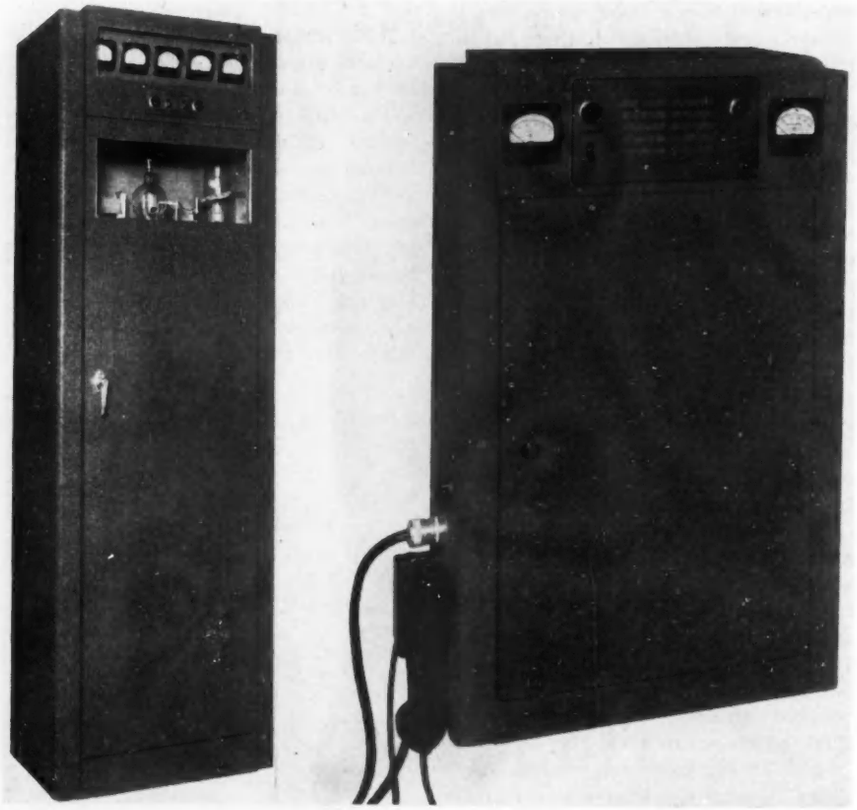


Fig. 12—Equipment suitable for use at the central office end of a radio link. (On the left a 250-UFS transmitter and 1908 transmitter; on the right a 50-UFS transmitter and 1907 transmitter by courtesy of Link Radio Corp.)

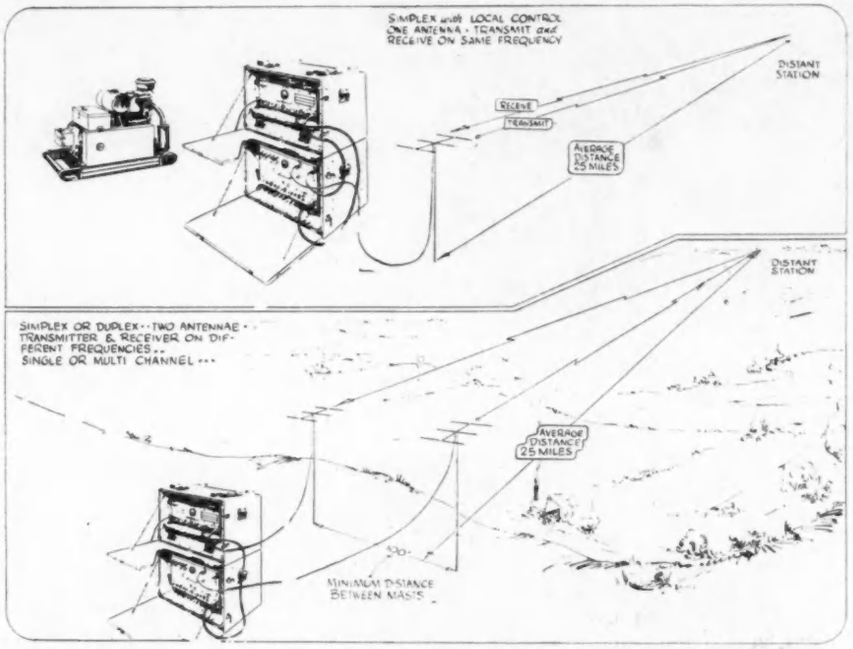


Fig. 13—Units useful over a range of 20 to 30 miles and operating in the frequency range of 70-100 megacycles. Unit above transmits and receives on the same frequency with one antenna. Unit at bottom utilizes two antennas, transmitting and receiving on different frequencies. (Courtesy Link Radio Corp.)

Electric motors are now being used to dig holes by means of the portable electric earth auger. It seems to me that motors would be just as useful for tree trimming operations, for drilling poles, for cutting off old poles, etc. They should prove particularly useful in the removal of heavy hedge growth and overhead tree trimming.

They could serve well and economically in connection with such applications as pumping water from manholes, operating electric tampers and many other uses.

Military type chain saws would make short work of heavy hedge growth and old sprouting stumps. Used in conjunction with truck mounted aerial ladders the motorized saw would be equally useful and should drastically reduce tree trimming costs.

Kamo Earth Auger

The development of the Kamo company of Chicago of the portable electric earth auger shown in Fig. 15 has brought electricity into the outside construction field for the first time. These augers are being used successfully in many parts of the country for drilling in all types of soils. I recently conducted a survey covering four states for the purpose of obtaining operating company data on the experience with this relatively new method of digging pole holes. Every company with which I was in touch stated they were highly pleased with the use of their electrical earth auger.

It will be noted that the experience of the companies reporting varied rather widely. But all showed considerable economy in the use of the motor driven digger. Based on the data collected, I came to the conclusion that a three man crew should be able to dig about 10 to 12 four foot holes per hour in good soil. This takes into account travelling time, average span lengths, and other factors which must necessarily enter into such a study. This figure is somewhat more conservative than the data which I collected would indicate to be necessary. However, it is based on average results in average soil and with careful timing of all operations. A crew out to establish a record would surpass my estimate while one with an inclination to take things easy on a hot day would do fewer holes than I have indicated.

An interesting recent development of the Kamo company is a special drill support attachment as shown in Fig. 16 which holds the drill and by means of a small elevating motor lifts it from the hole.

Portable Power on the Job

It is my prediction that we are fast approaching the time when telephone companies will find it expedient and good economy to equip all their construction trucks with electric power generators. These will be driven either by the truck motor or will be of the portable gas engine driven type. These generators should have a capacity of from 2½ to 3 KVA at 110 volts and 60 cycles.

It should be feasible to mount these generator units directly in the engine compartment on the larger trucks. Whether or not a generator driven by the truck motor would be a more economical and practical arrangement than a portable gasoline driven generator in the back of the truck is a design problem that would need to be worked out.

The primary purpose of a power source of adequate size would be the furnishing of current for the operation of the electric earth auger and possibly an electric tamper. It would also have a number of auxiliary applications.

Some of these auxiliary uses are:

(1) Supplying emergency power for the central office.

(2) Operating flood lights when extensive line repairs must be made at night.

(3) Furnishing power for operating electric drills and saws for pole framing and other operations.

(4) Operating motor driven manhole pumps and blowers.

(5) Operating an electric heater in the rear of a construction truck during winter storm emergencies.

(6) Operating small electric winches on the smaller trucks.

(7) Operating motor driven wire rewinding reels.

(8) Operating electric motor driven truck mounted tool grinder.

(9) Drilling anchor holes.

(10) Trenching for pole set-back operations.

(11) Digging trenches for buried cable or conduit.

(Please turn to page 50)

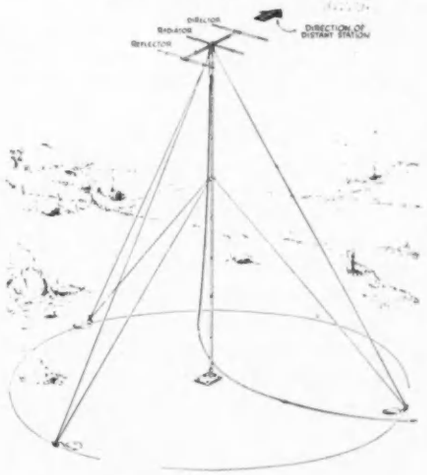


Fig. 14—Antenna system consisting of a 40 foot steel pole and three one-half wave elements (one as director, one as reflector and middle one as radiator) useful for such telephone applications as rural subscriber or short haul toll links. (Courtesy Link Radio Corp.)

National and State Association NEWS

South Carolina Convention

Reported by S. B. Green

APPROXIMATELY 100 telephone people registered at the eleventh annual convention of the South Carolina Independent Telephone Association which met November 15 and 16 at the Ocean Forest Hotel, Myrtle Beach, South Carolina.

There were no plant or traffic conferences at this meeting, all the sessions being devoted to matters of general interest to management. At the business session on the 15th, S. L. Bell, president of the South Carolina Association, reviewed the association's activities during 1945 and recommended a careful study of rural development and the possibilities of converting to dial operation. Following Mr. Bell's address, C. C. Leiby of Sumter, secretary and treasurer, made his report. President Bell then appointed H. W. Askins, of Chesnee and T. C. Thomasson of Lancaster as a Nominating Committee; R. L. Seymour and O. W. Knight to serve on the Resolutions Committee and for the Auditing Committee named C. B. Barksdale of Greenwood and S. A. George of Lexington.

C. B. Barksdale, Greenwood, S. B. George, Lexington, S. B. Green, Sumter were reelected directors for a three year term, ending in 1948 and S. L. Bell, Chester; S. B. Green, Sumter; and C. C. Leiby, Sumter were reelected president, vice president, and secretary-treasurer respectively.

Colonel William C. Henry of Bellevue, Ohio, president of the United States Independent Telephone Association was then presented and he made a most timely and interesting address on the outlook for the telephone industry from a national standpoint. Following his official address, Col. Henry was asked to tell something of his experiences as chief of Telecommunications on General Eisenhower's staff. He said it fell to his lot to accompany a committee of United States Senators headed by Burton K. Wheeler of Montana all over the European theatre and his description of this tour was most interesting.

Officers and directors of the South Carolina Independent Telephone Association. From L to R: C. C. Leiby, Sumter, secretary-treasurer; S. L. Bell, Chester, president; E. T. Campbell, Georgetown, director; S. B. Green, Sumter, vice president; H. W. Askins, Chesnee, director; F. S. Barnes, Rock Hill, director; T. C. Thomasson, Lancaster, director; W. C. Henry, USITA president and guest speaker at the South Carolina convention; A. O. Bolen, Swansea, director; C. B. Barksdale, Greenwood, and S. B. George, Lexington, are also directors but were not present for the picture.

On the 16th the manufacturers' representatives were introduced and cordially welcomed and in a management conference Luke W. Hill of Carolina Telephone and Telegraph Company of Tarboro, North Carolina, spoke on conversion to automatic operation and E. H. Wasson, Charlotte, North Carolina, Carolinas' Manager of the Southern Bell Telephone and Telegraph Company led a discussion on rural service development.

The convention was a great success from a social standpoint, with an oyster roast and sea food dinner the first evening of the convention, and from the accomplishment angle, with interesting and instructive talks and discussions between the various telephone company members and manufacturers' representatives.

At the closing session of the 11th annual convention of the South Carolina Independent Telephone Association on November 16 at the Ocean Forest Hotel in Myrtle Beach.

Francis M. Shuford, manager of the South Carolina Continental Telephone Company's Waterboro exchange, is responsible for the fine photographic coverage of the South Carolina convention.

Christmas Message from USITA's President

Christmas 1945—The Holiday Season we have waited for through almost four years of World Conflict—will soon be here. More than half of the boys who served in our Army, Navy and Air Forces have returned and will join with their families and loved ones, in their own homes and their own churches, to celebrate the birth of Christ. Although complete World Peace is not yet a reality, large scale armed conflict has ended, and this Christmas will be the happiest one we have enjoyed since 1940.

And after Yuletide will come New Year's with 1946 stretching out ahead of us. What will it bring? Will we find National Industrial Peace in these United States? This country hated military conflict, but once the issues were drawn, it rose grim and tough to the job of seeing it through to complete victory. Now in the months ahead will we have sufficient wisdom, calm judgment, understanding and determination to avoid industrial conflict in order that employee and employer may join forces in a united effort to reach a new level of national prosperity? That is a challenge which confronts each one of us. The Telephone Industry, which has achieved such an outstanding record of service during the War, must now dedicate itself to the task of providing More and Better Service. That is a New Year's Resolution, the realization of which, will call for the best efforts of us all.

To each one of you in the big family of the Independent Telephone Industry, I sincerely wish you a Very Merry Christmas, and an even Happier New Year.

Sincerely,
Wm. C. Henry, President
United States Independent Telephone Association

Georgia Convention

THE annual convention of the Georgia Telephone Association was held at the Henry Grady Hotel on November 22 and 23, 1945 with approximately 100 delegates attending.

The constitution and bylaws were amended to the effect that there are to be eleven directors instead of the present ten. Arlie New of Thomaston, Georgia was elected a director of the Association together with the other ten members who were reelected for the coming year. At the board of directors meeting immediately after the close of the annual session, the following officers were reelected to serve for 1946: J. E. Kirk, president, Dalton; J. C. Jennings, 1st vice president, Hawkinsville; A. A. Fincher, 2nd vice president, Canton; R. S. Griffin, secretary, Monroe; and W. A. Echols, treasurer, Commerce.

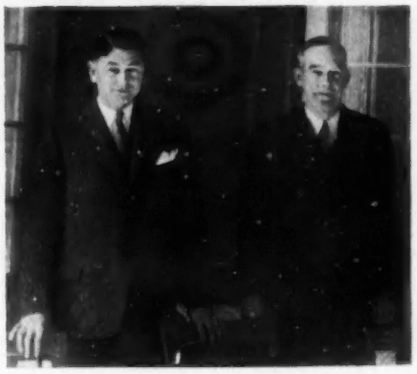
The general meeting opened at 2:00 P.M. on November 22 with the president's report by President Kirk and the secretary's report by Secretary Griffin. After the general business was disposed of, Mr. Clyde S. Bailey addressed the general session on Proposed Legislation in Congress at this time and his address was very interesting and informative, inasmuch as he covered very thoroughly the present status of the Hill Rural Telephone Bill, and the Minimum Wage Bill now pending in Congress.

Col. Norman Sanders with the Kellogg Switchboard and Supply Company of Chicago then gave an interesting talk on Toll Dialing.

After an Association banquet in the evening of November 22 Mr. Edmund Harding of Washington, N. C. delighted the meeting with his numerous jokes and good music.

On the morning of November 23 Mr. Walter R. McDonald, chairman of the Georgia Public Service Commission addressed the meeting on Postwar Telephone Industry. Mr. McDonald discussed several phases of the telephone industry and most especially the recent questionnaire which was sent in by the Telephone Companies in Georgia as to their plans for taking care of the great many requests for telephone service.

Then a representative of the Bell Company showed two entertaining pictures on the telephone industry.



Two colonels stand for Francis M. Shuford's camera. Col. Wm. C. Henry (left), USITA president and guest speaker at the S. Carolina convention, and Lt. Col. C. Bruce Barksdale, president, Greenwood (S.C.) Telephone Company, both in mufti and back at their former jobs.

TELEPHONE ENGINEER photos of the Alabama convention are on page 29 and the report of their annual meeting appeared in the December 1 FORTNIGHTLY.

Convention Dates

Minnesota Telephone Association, St. Paul Hotel, St. Paul, January 28, 29 and 30, 1946.

Kentucky Telephone Association, April 4 and 5, 1946; no place yet named.

Nebraska Telephone Association, Paxton Hotel, Omaha, April 9-10, 1946.

Iowa Telephone Association, Ft. Des Moines Hotel, Des Moines, April 11-12, 1946.

National Executive Conference, USITA, Edgewater Beach Hotel, Chicago, Illinois, April 16 and 17, 1946.

Ohio Telephone Association, Deshler-Wallick Hotel, Columbus, April 23-24, 1946.

Indiana Telephone Association, Severin Hotel, Indianapolis, May 1-2, 1946.

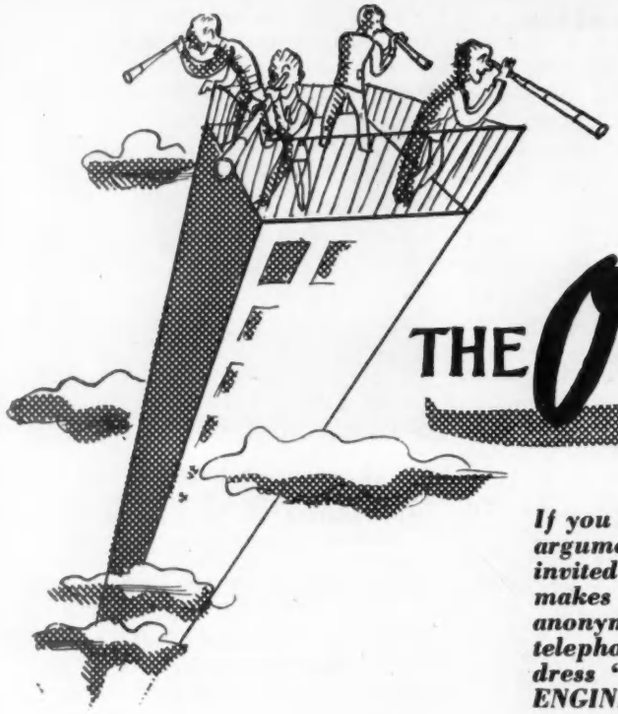
Illinois Telephone Association, Pere Marquette Hotel, Peoria, May 8 and 9, 1946.

New York Telephone Association, Hotel Onondaga, Syracuse, May 22 and 23, 1946.

Pennsylvania Telephone Association, Hotel Lawrence, Erie, June 4-5-6, 1946.

USITA National Convention, Stevens Hotel, Chicago, Illinois, October 14, 15, and 16, 1946.

At the South Carolina convention from L to R: Luke W. Hill, Wm. C. Henry, USITA pres.; S. L. Bell, pres. of S. C. Assoc., re-elected for another year; and E. H. Wasson.



Conducted by the
Observer and his Gang

THE Observation Tower

If you have observations or even a friendly bit of argument suitable for use in this column, you are invited to send them along, which automatically makes you a member of the Gang. You will be anonymous—no names of telephone people or telephone companies are used in this column. Address "The Observer," in care of TELEPHONE ENGINEER AND MANAGEMENT.

Here's a Cure for Labor-Industry Troubles

GANG Member No. 16 has a plan for settling all labor-industry disputes, both present and future.

He would fire all managers of business for a couple years, and put business in charge of the labor leaders, politicians, members of the U. S. Treasury Department and public service commissioners. Then, if any of these new managers failed to make as high a percentage of profit on any business they were managing, as the old business management had made, they would be sent to jail.

Then he would put the business managers in charge of the unions, the Treasury Department, the public service commissions and in elective political jobs. Then, every six months, these guys would have to run for reelection, on their record, to the jobs they held, and if any of them failed to get re-elected, they would go to jail.

Gangster No. 16 figures that under his scheme the labor leaders, politicians, etc., would learn something about what it means to meet a payroll, make a profit, satisfy customers and stockholders, and so on. He also figures that the present business managers would learn something about being responsible to voters and what a fellow has to do to keep a political job.

At the end of two years he would let them all out of jail—he figures most of them would be in there by that time—and go back to the present system, everybody getting his old job back again.

But, opines this Gangster, there wouldn't be any more labor-industry disputes after that, because everybody on one side would know so much about the problems of the other side that they'd all be willing and able to sit down together and settle everything amiably and sensibly.

Gangster No. 16 wants us to sponsor his plan on a nation-wide basis. But when we asked him what he would do to help, he said he thought he'd take a vacation in the South Sea Islands during the trial period. He figures that if he stays home, he'll go to jail with the rest of the business managers.

We've agreed to sponsor the plan, however, but conditionally. The condition is that this Gangster pays our expenses for a two years' stay in the South Sea Islands, too.

Why No Kiosks?

AN Army officer recently returned from overseas has asked us why we don't have any pay station telephones in street-corner kiosks in this country. Says he found such kiosk telephones very convenient in some countries in which he was stationed, and he thinks it is peculiar to find anything about telephones that is not better in the U. S. than in any other country in the world.

In order to be honest, which we frequently are, we told him the truth—which is that we don't know.

We pointed out to him, however, that we understand that telephones in street kiosks are found mostly in countries where the telephone is a governmental institution. He said that made it all the more peculiar, because he had always heard that the telephone was most efficient where it was under private, and not governmental, operation.

That is about as far as we got with this gentleman, but we've been doing some thinking about the proposition since then.

We don't know just how much street corner telephones would add to public convenience in a country where almost every drugstore, and many other businesses, have pay telephones for public use. Many of these businesses—particularly the drug-stores—are open to the public at night.

Also, there would have to be a deal with the city for the use of sidewalks or other public places for kiosks. No doubt the city would want a cut in the proceeds—and maybe the present businesses with public pay stations would object to this new kind of competition.

There would also be the proposition of protecting the money in the kiosk coin boxes. Here in Chicago the boys from the "back of the yards" might get into the habit of jimmying all of them open every night.

But it's something to think about. If you've got any ideas on the subject, send them along.

Yes, There is an Independent Telephone Industry

EVERY now and then we still run across one of those ignorant people (ignorant, at least, about the telephone industry) who is surprised to learn that there are Independent telephone companies in this country.

"Please wait outside—I'll let you know when it's fixed."

When that happens, we undertake to educate the person, so that he or she will thereafter remember the facts. We display the map put out some years ago by the United States Independent Telephone Association, which shows all of those Independent telephone exchanges—something more than 12,000—spotted on it. We also produce facts and figures about the industry and, of course, we do a lot of talking.

Perhaps it is relatively unimportant whether or not the man in the street knows anything about the Independent telephone industry. But it is important that Congressmen, state legislators and others in public authority know the facts. That is particularly important when legislation is pending which, if it does not take the Independent telephone industry into account, might do that industry serious harm.

We think it would be a good thing if all Independent telephone people made it a practice to do everything they can to keep those in public authority informed of the fact that there is a large Independent telephone industry; that it has a real place in the communications picture of this country, and that it consists, numerically as to companies, largely of small and locally-owned units whose existence is an excellent example of the small businesses of this country that members of Congress and others are always talking so much about preserving.

The telephone associations are doing this all the time, of course. But they need the backing and assistance of Independent telephone people in the job.

Let's not hide our light under the proverbial bushel!

How Much is 2 Plus 2?

ONE of our statistics hounds, who is always digging up queer things in statistics, has been browsing through the statistical information, put out every so often by the national telephone association, about Independent telephone companies. Somewhere in all this dope he found that in the larger Independent companies—that is, the Class A companies—there were 564 accountants at the end of 1944, of which 146 were male and 418 female.

But, says this smarty-pants, according to the same period there were only 198 accountants in these same companies at the end of 1943, of which 151 were male and 47 female.

That evidently means, he says, that there were only 5 fewer male accountants in 1944 than in 1943, but there were 371 more female accountants. So, he figures, it requires 371 gals to take the place of 5 men in the telephone accounting business.

He has asked us to agree with this conclusion which, he says, is plainly shown by the statistics and figures—and, he says, figures don't lie.

Well, we're not going to agree with this conclusion, because we're smart. At least, we're smart enough not to agree to any conclusion so far as women are concerned. We know a lot of guys who have reached conclusions of one kind or another about women—and most of them are still running.

After a lot of heckling from us, this statistically-minded bozo admitted that he was just kidding. He also asked us not to print anything about the matter. Said his wife might find out that he had instigated it, and it's too cold to sleep in the woodshed these nights.

We're telling about it, however, and we're doing that for the purpose of showing up these statistics hounds. The plain fact is that any good statistician can make a monkey out of figures if he wants to do that. All he has to do is to use the figures that favor the side of the case he's on, and forget all about those which show it up to disadvantage. Most statisticians don't do that, of course, because they're after the real facts—but it can be done.

That's the reason why a perfectly good case can frequently be presented, by the use of figures, for both sides of any question.

So if you want to know how much is 2 plus 2, don't ask a statistician unless you know he's honest. Otherwise he might prove to you that 2 plus 2 equals 6.47 and a fraction.

Tempus Fugit!

HERE we are at the end of another year. A lot of water has gone over the dam, or under the bridge—whichever expression you prefer—in the past twelve months. As to a great deal of it, we can be glad that it has gone.

But the main thing is that victory has come. The war is over. The fearful carnage and destruction raging throughout the world when we ended last year, has ceased.

The world still has plenty of problems. So does the telephone industry. So do most individuals. But they are the kind that can be worked out in peacetime, and settled, we hope, for good.

So, as we approach our first peacetime Christmas in five years, let's be thankful that the days ahead are not to be days of war; that, by the grace of God and the valor and sacrifice of millions of American boys and of our Allies, victory has come.

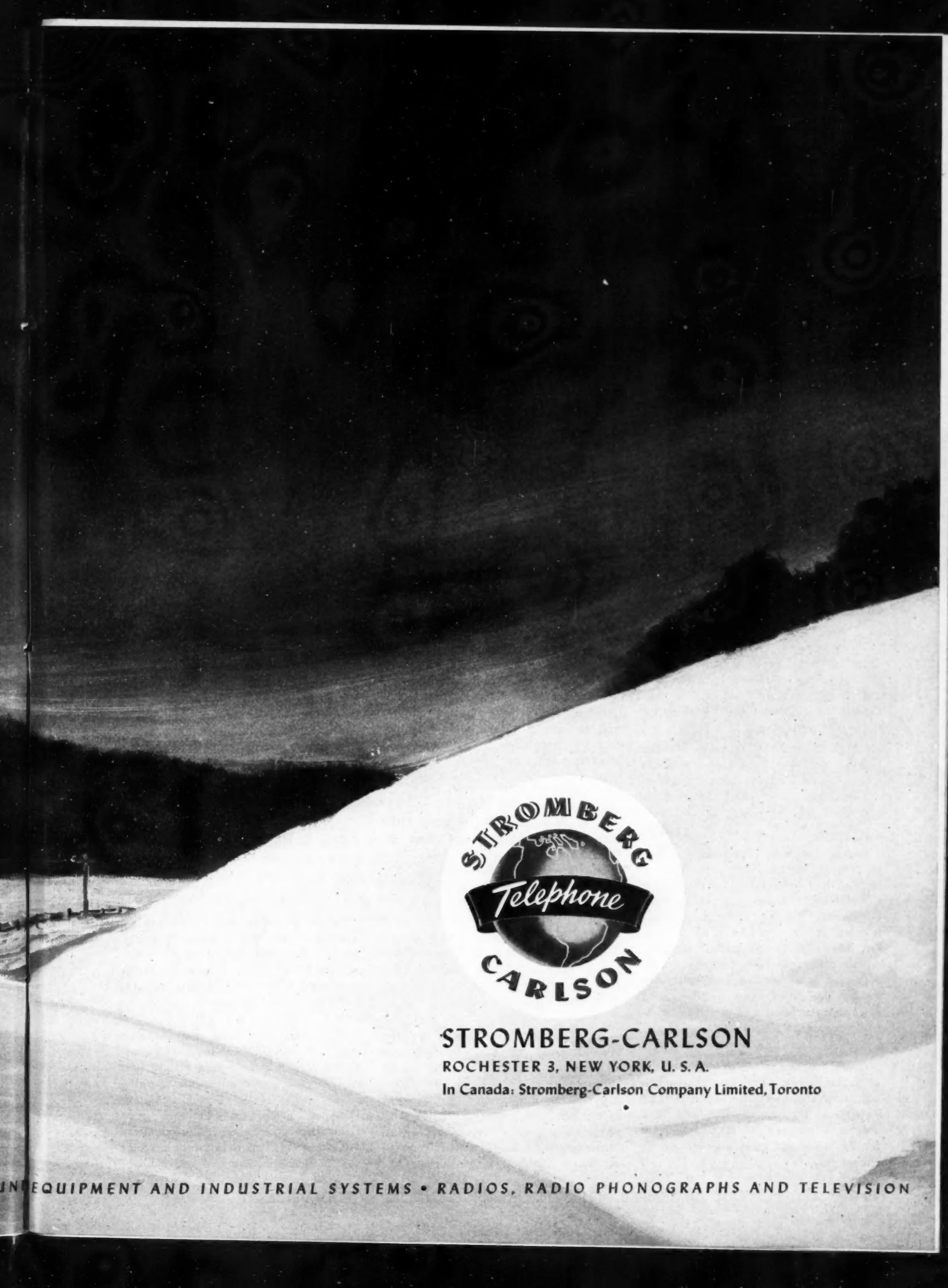
And, this being our last column for 1945, we wish for every one of you—

A Merry Christmas and Happy New Year!

Christmas...

and the hearts of a mighty Nation humbly grateful for the gift of Peace! What more fitting time than now to dedicate ourselves anew to the precepts of the Prince of Peace, that the sacrifice of those who fought for us shall not have been in vain?

TELEPHONES, SWITCHBOARDS AND INTERCOMMUNICATION SYSTEMS • SOUND EQUIP



STROMBERG-CARLSON

ROCHESTER 3, NEW YORK, U. S. A.

In Canada: Stromberg-Carlson Company Limited, Toronto

•

IN EQUIPMENT AND INDUSTRIAL SYSTEMS • RADIOS, RADIO PHONOGRAPHS AND TELEVISION

Personalities

James Boyd is the new manager of the Alexandria (Minn.) Telephone Company as well as secretary-treasurer of the company. He studied communications work at the University of Minnesota and graduated as an electrical engineer in 1943. Mr. Boyd left his position in research work of Kellogg Switchboard & Supply in order to take over the managership of his home town telephone company.

●

J. G. Hardy, secretary-treasurer of the Illinois Association, reports that the tentative dates of May 8-9 for their annual meeting are now definite ones; and they expect it to be the best convention ever held by the Illinois group.

●

Mr. and **Mrs. Glenn I. French** of Camden, New York have taken possession of the Williamstown (N. Y.) Telephone Company, which they purchased from **Dennis F. Healy.**

●

C. F. Ashman, manager of the Northwood (Iowa) Telephone Company, has announced completion of extension of their rural lines at an estimated cost of $2,600.

●

Dr. Frederick B. Llewellyn, of Summit, New Jersey, is to be president of the Institute of Radio Engineers for the year 1946. He succeeds **Dr. William L. Everitt,** head of Electrical Engineering at the University of Illinois. Dr. Llewellyn, a consulting engineer on the staff of Bell Telephone Laboratories, is an international authority on the design of vacuum tubes used for communication and electronic control purposes.

●

O. A. Logue, president of the C. T. & N. Telephone Company, Casey, Illinois, now also owns the Greenup (Ill.) Telephone Exchange. **Mr.** and **Mrs. Logue** have been in telephone work for 33 years and own a group of six exchanges.

Ralph Van Trine

Ralph Van Trine, vice president and general manager of the Durham (N.C.) Telephone Company, is the newly elected president of the North Carolina Telephone Association, as well as one of the directors. Active in association affairs, Mr. Van Trine was program chairman of their November convention and did a splendid job.

●

C. E. Frey, president of Troy (Ill.) Telephone Company, and **Leo E. Breithaupt,** mgr. of the Odin Telephone Company of Sandoval, Ill., are new members of the Illinois Telephone Association.

●

J. L. Trevillion is the new owner of the Milo (Iowa) Telephone Company and the Lacona (Iowa) Telephone Exchange, which he purchased from **Mrs. Claire Quiggle.**

●

Dr. Hans Bethe of Cornell and **Dr. Harold Urey** of the University of Chicago have been December guest speakers for the U. S. Rubber Company during the Sunday Philharmonic broadcasts in a series of science talks on atomic energy. Copies of the informative talks may be had by writing U. S. Rubber, New York.

Timothy Bergin has purchased the Cazenovia (Wis.) Telephone Company, from **Mrs. Una Hale,** who owned and managed the company for over twenty years. Mr. Bergin plans to assume charge of the exchange about January 1.

●

Frank Nydam, formerly engineer of manufacture of the Illinois division of Bendix Aviation, is now in the same capacity with Kellogg Switchboard & Supply Company.

●

C. E. Archer, president of the Florida Telephone Association, has notified each member company that their annual meeting is being postponed until the fall of 1946 to fit in with other southern state conventions and give the manufacturers an opportunity to proceed from one to the other of these conventions.

●

Francis M. Shuford, manager at Walterboro, S. C. for South Carolina Continental Telephone Company, is also an outstanding amateur photographer. His pictures of the South Carolina convention appear in this issue.

●

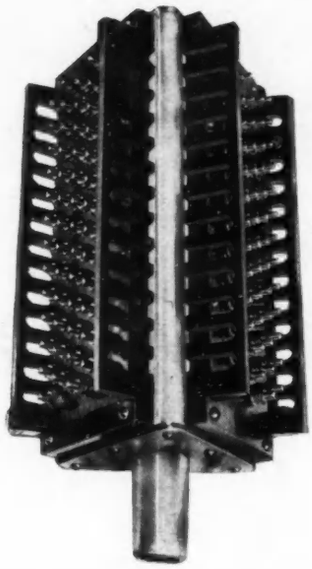
We regret to report the death of **Bertha I. Nuckols** on November 21. **J. A. Nuckols** is manager of the Halsey (Oregon) Telephone Company.

●

Frank Bracelin, vice president of Northwestern Bell, retired recently on his 65th birthday, after 46 years in telephone work. **Glenn L. Allen** succeeded him as Minnesota general manager of the company.

●

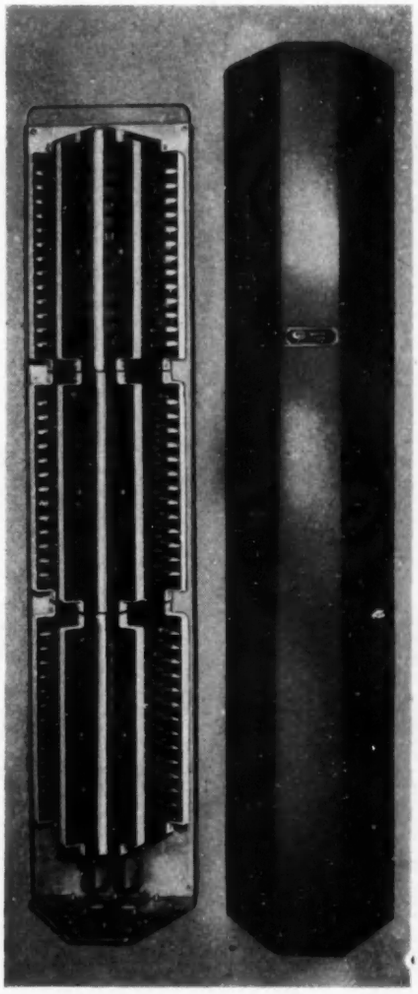
T. L. Hall, vice pres. and assistant mgr., and **H. P. Mahoney,** chief engineer of A.T.&T. report a total loss of $7,000,000 out of an estimated value of $7,800,000 of the Philippine Long Distance Telephone Company since December 7, 1941. Approximately $40,000 of this loss is in motor vehicles and $850,000 in underground cable.



UNIFLEX

CABLE TERMINALS

Extreme Flexibility for Terminating, Distributing, Looping and Cross-connecting Telephone Cables.



The Uniflex is a late development of Cook engineers for providing the utmost in flexibility and space saving for terminating, distributing, testing and cross-connecting telephone cables. It is adaptable to a wide variety of uses and occupies only about one-half the space required by ordinary terminals, binding post chambers or pot heads formerly used for similar purposes.

Uniflex Cable Terminals, as the name implies, are built up of standard units which are combined to produce unprotected cable terminals for pole mounting in wood or metal pole houses or in Cook Terminal Vaults. The single frame units (26, 51 or 76 pairs) for outdoor use can be furnished with a regular cable terminal pole mounting bracket and hood.

The mass production economy of standard basic units and the ease and speed with which these units can be combined to furnish cable termination of almost any size and dimension offer unusual low cost initial investment, installation conveniences and flexibility. Uniflex Terminals are also ideally suited for mounting in pedestals for use in underground cable distribution systems.

For complete description and diagrams of the Uniflex Cable Terminal assemblies, sizes and construction, see your Cook catalog. Keep a Cook catalog handy for ready reference for all Cook products. It's the best line for your line.

COOK ELECTRIC Company

2700 SOUTHPORT AVENUE • CHICAGO 14, ILLINOIS

Season's
from
AUTOMATIC
ELECTR

Greetings

At this holiday season, it is pleasant to recall the many friends whose good will we enjoy—the telephone men in all parts of the world whom we are honored to know and to serve. Your friendship down through the years has made possible the worldwide acceptance of Automatic Electric products, and for it we are sincerely grateful. We are glad that this year we can again, in the good old-fashioned way, send you our hearty wishes for a Merry Christmas and a Happy New Year!

AUTOMATIC ELECTRIC COMPANY

Automatic Electric Sales Corporation

International Automatic Electric Corporation

*

Highlights of the Communications News

Important Communications developments of the past month, briefed for busy readers

by
ROLAND C. DAVIES
Editor, Telecommunications Reports

Trends

Many important and diverse activities, particularly on the labor front, of significance to the telephone industry occurred during the first two weeks in December and probably will be carried on without stop for the remainder of this month except for a brief respite in the Yuletide season.

Showing the difference between prewar days and the present, the scene of most events of importance to the industry is in government agencies handling labor and wage matters and in the halls of Congress instead of the Federal Communications Commission, the body regulating the industry.

Wage-Hour

The Senate Education and Labor Subcommittee, which held hearings on the proposal to postpone the minimum wage to 65c an hour, in a surprise exhibition of speed reported the measure to the full Senate committee which was due to take action as we went to press. On the House side, the Labor Committee still is withholding any action on the minimum wage measure awaiting the return of Mrs. Norton, its chairman, from a serious illness.

The Senate minimum wage bill, sponsored by Senator Pepper, D., Fla., has been reported to the full committee and didn't change the exemption of Independent telephone companies, which frees them from the minimum wages to switchboard operators in communities with less than 500 stations. The USITA had asked for the increase in this exemption to 1,000 stations.

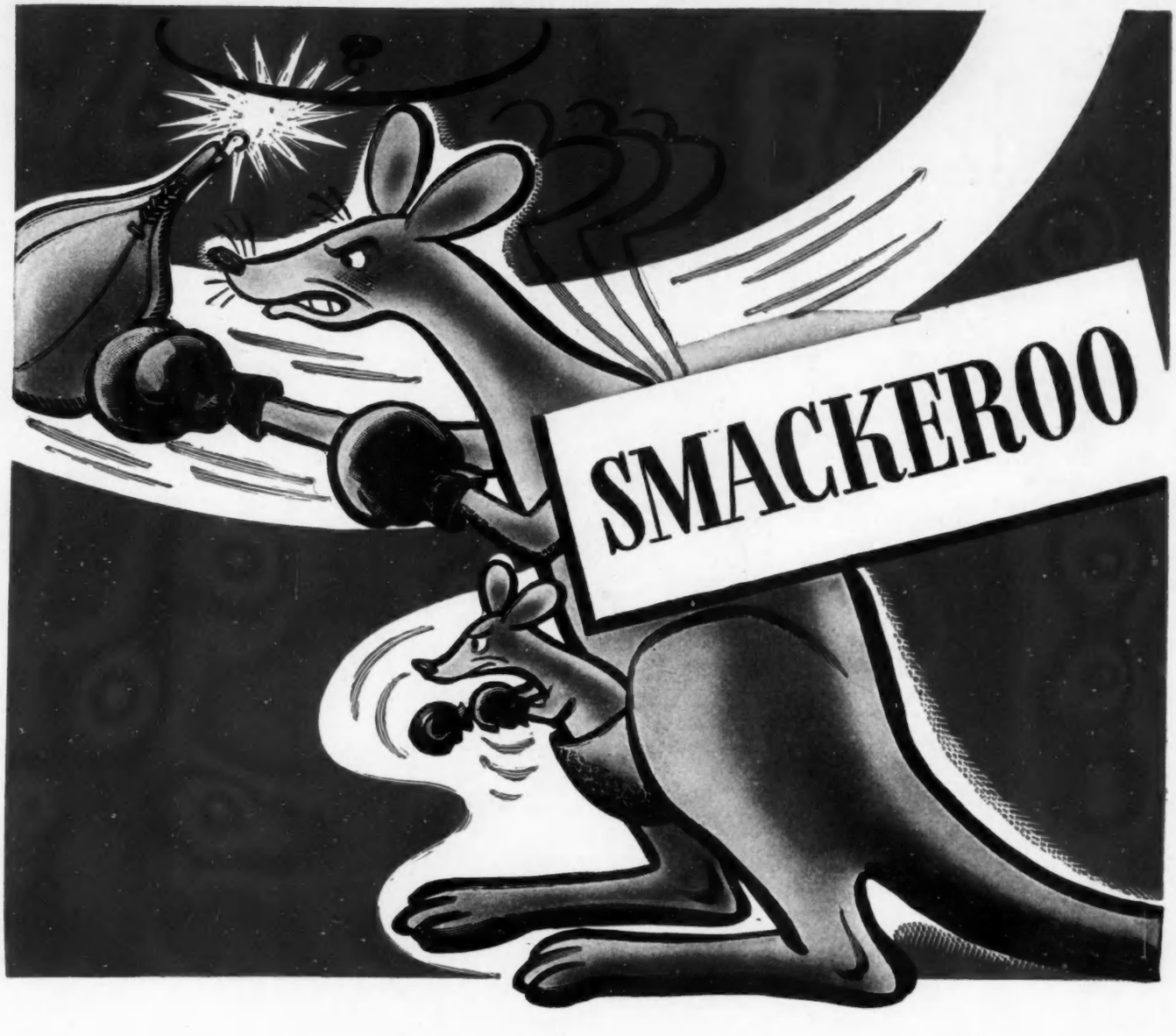
Even though the Senate did not expect to act until after the first of the year on minimum wage legislation the small companies of the Independent telephone industry, as well as State Independent Telephone Associations, will have to present their views speedily to the members of Congress from their respective states on the tremendously injurious effects of such a boost in wages upon the telephone service in small cities and towns and also upon the total of employment in their own telephone companies. Many members of Congress are cognizant of the impact of such a wage cost increase in small communities and will be favorable to such data from the small Independent companies as these Congressmen feel the Washington thinking that tries to put the entire nation into one slot of metropolitan cities is erroneous and harmful to the economy of America.

However, the minimum wage legislation has been definitely shoved into the background by the more important labor measures of the Truman Administration and by Congress in efforts to curb the rising tide of strikes and labor unrest. These measures, ranging from the "cooling-off" fact-finding program offered by the President to the no-strike bills of several important Senators and Representatives, are now in the forefront. The fact-finding panel plan, opposed by both the CIO, most vigorously, and the AFL, started on its Congressional journey with hearings during the second week in December, but, due to the controversy-charged atmosphere around this program, there was thought little chance of Congressional action until after the Christmas recess.

The measures which would impose heavy penalties on unions for violating no-strike pledges or for racketeering in interstate commerce will also receive Congressional attention. Then, too, in the Senate there is the Burton-Ball-Hatch bill to rectify the labor

(Please turn to page 62)

More than just a trimming, your annual purchase of Christmas Seals means that you are helping to make 1946 a healthy year.



That's the way a 27½ pound hammer, falling free, hits in the "impact test" given all U. S. Royal Cords and Cables. As many as two thousand blows in rapid succession without the cable failing!

A whole series of such tests is made on U. S. Royal Cables—heat, cold, compression, stretch—tests that prove the stamina to take rough treatment in the field.

Yes sir, these Royal Cables have everything you need for long, trouble-free service...you can specify them with complete confidence.

THE NEW U. S. ROYAL *Safety Tested*

ELECTRICAL CORDS AND CABLES

Listen to "Science Looks Forward"—new series of talks by the great scientists of America—on the Philharmonic-Symphony Program. CBS network, Sunday afternoon, 3:00 to 4:30 E. S. T.

UNITED STATES RUBBER COMPANY

SERVING THROUGH SCIENCE ***WITH ELECTRICAL WIRES AND CABLES***

1230 Sixth Avenue • Rockefeller Center • New York 20, N. Y.

In Canada: Dominion Rubber Co., Ltd.

YESTERDAY AND TODAY

WE'VE BEEN MAKING

GRAY PAY STATIONS

SINCE 1891

— and from the day Gray installed the first Pay Telephone in Hartford, the search toward perfection has never ceased. Just as today's Pay Station bears little resemblance to the early model, so do we expect tomorrow's improvements to make obsolete the machine of today. Gray looks to tomorrow with confidence and points to the new Gray Audiograph shown on the opposite page, as one reason for that confidence. It incorporates the most advanced electronic principles.

CITY CALL
Remove receiver from hook, drop nickel in proper slot, then dial number wanted.
If call is not answered, coin will be returned when receiver is replaced.
LONG DISTANCE CALL
Proceed as above and dial
The Gray Manufacturing Company
Hartford Conn U.S.A.
COIN RETURN

Authorized Agents: Kellogg Switchboard & Supply Company • Graybar Electric Company Stromberg-Carlson • Automatic Electric Sales Corp. • The North Electric Mfg. Co. • Leich Sales Corporation • Northern Electric Co., Ltd. Automatic Electric (Canada), Ltd.

ARMY E NAVY

THE GRAY

W. E. SITMARS *President*

. . . AND TOMORROW

WE'LL BE MAKING THOUSANDS OF

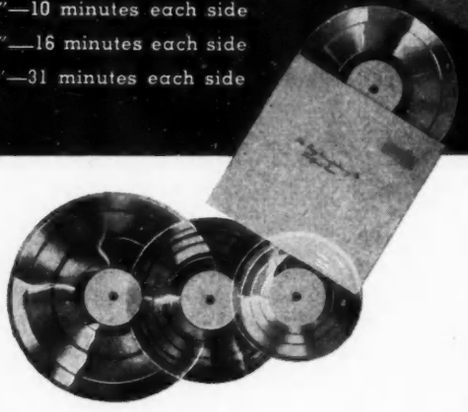
GRAY AUDOGRAPHS

The Audograph uses paper-thin plastic Flexograph discs in three sizes:

5¾"—10 minutes each side

6¾"—16 minutes each side

8½"—31 minutes each side



No other recording machine has all the features of the Gray Audograph — that's why its worth waiting to see . . . and buy!

- **so rugged and stable it operates in any position . . . even upside down or on its side!**
- **handsome, compact (the fountain pen gives you an idea of its size) Weight about 12 pounds — dimensions 9½x9½x6½.**
- **easy to use — record or listen by the flick of a lever.**
- **instantaneous start-stop, back-space, visible correction marker, and lapsed time indicator.**
- **built-in speaker and jack for earphones or "soft" speaker.**
- **turn the knob at right to put any groove of the record under the stylus.**

MANUFACTURING COMPANY

16 ARBOR STREET, HARTFORD 6, CONN. • 230 PARK AVENUE, NEW YORK 17, N. Y.

Walker Outlines Communications DEVELOPMENTS; Need for FEDERAL-STATE Regulatory Cooperation

By ROLAND C. DAVIES
Editor, Telecommunications Reports

OUTLINING the many developments out of the war which will lead to expansion and improvement of telephone and telegraph communications, FCC Commissioner Paul A. Walker, in his address before the NARUC Convention December 5, emphasized it was the cooperative task of Federal and State commissions to see that through regulation these new developments serve the public interest and that the telephone and telegraph industries "provide a speedier and more economical service to the people." He strongly advocated the plan of a special FCC regulatory group, including accounting, engineering and legal experts, to be made available to State commissions in providing technical assistance for regulatory purposes.

"The new developments in telecommunications challenge the best efforts of Federal and State commissioners," Commissioner Walker stated, pointing to the expressions of the late President Roosevelt about the new frontiers which must be pioneered "with the same vision, boldness and drive with which we have waged this war" so as "to create a fuller and more fruitful employment and a fuller and more fruitful life." Joint studies and exchange of information between Federal and State commissions, Commissioner Walker declared, "can assist in seeing that the telegraph and telephone industries adapt themselves to postwar conditions."

The FCC Commissioner stated that new problems undoubtedly will arise. He cited that as an example the developments in radio and the resulting expansion in mobile telephone service may well present problems in the handling of which cooperation between Federal and State commissions "may be most appropriate, if not essential."

After relating that, as of 1944, the gross assets of the Bell System and Independent telephone companies amounted to nearly seven billion dollars, with more than 23 million telephones, more than 100 million miles of wire and more than 365,000 employees, Commissioner Walker stated that with the development of coaxial cable and radio relay systems and other improvements, their operations will greatly expand. Similarly, he declared, Western Union with gross assets of over $450 million will have a vastly enlarged plant with its plans to use the latest techniques for improved telegraph service like radio relay and facsimile.

"All this expansion along with the many new and varied uses of radio, both in FM, television and facsimile, both foreign and domestic, will further accentuate the need for public regulation," Commissioner Walker stressed. "If this regulation is to keep pace with technological progress and expanding industry, **Federal and State commissions should be provided with increased facilities and larger staffs.**"

Recalling that at the time of the Special Telephone Investigation he had suggested the development of a Federal regulatory group to aid State commissions, Commissioner Walker stated that it was his hope "we can build up an adequate staff of experts who, in addition to serving Federal regulatory purposes, may cooperate and aid State commissions by providing technical assistance to those who may request it.

"As the communications industry expands, there will be greater need for cooperation between Federal and State commissions. Cooperative studies and procedures have been fruitful in the past but much work lies ahead. Matters of depreciation practices, proper rate of return, original cost, Western Electric costs and license contracts, Bell System pension plans and patent policies will take on added importance as the telephone and telegraph industries expand. The postwar expansion of the Bell System alone will involve an extensive reorganization of its domestic plant and entail an expenditure of some two billion dollars. The magnitude and complexity of the regulatory problems which face us call for unity of purpose and action among all regulatory bodies."

The merger of Postal Telegraph and Western Union brought about new problems in regulation, Commissioner Walker told the NARUC significantly, because in his previous addresses he has generally confined his remarks to the telephone industry regulatory problems.

He cited that in July, 1945, Western Union had offered a plan in compliance with the FCC mandate for the development and submission of a comprehensive and modern program, which provides for complete replacement over a five-year period of the entire existing Western Union plant. This plan calls for cash expenditures at the annual rate of $13 million, beginning in 1946, and contemplates the setting up of a radio relay system between major cities, the leasing of other facilities from the Bell System, the eventual disposition of present outside wire plants along railroads, and the establishment of Telefax equipment to supplement, if not supplant, messenger pick-up and delivery. **"The success of this plan in providing efficient service at low rates and the future of the domestic telegraph industry will depend to a large extent on effective regulation,"** Commissioner Walker stressed.

Many significant communications developments were summarized in the address of Commissioner Walker. He cited that the recent improvement in transmitters, receivers and highly directional antennas for use on higher frequencies will make possible the inauguration of nation-wide radio relay systems with the possibility of doing away with wires . . . The efficiency of this new point-to-point radio technique is apparent for telegraph messages and telephone calls, while less equipment will be required than in wire systems and the cost of maintaining poles and wires will be largely eliminated and rates of service should be materially reduced . . . will obviate much of the delay and inefficiency which sometimes characterize our present system of manual operation . . . The use of "pulse time modulation" for radio relay of telephone and telegraph service promises a considerable economy since it increases the potential utilization of a radio frequency . . . Coaxial cable systems have gone far beyond the experimental stage and have improved their dependability for transmitting telephone, telegraph, television or other signals . . . Toll dialing should increase the average speed for completing calls and generally be more accurate and less subject to interruptions and cut-offs.

These various improvements "mean" reduced rates which are interesting to contemplate, Commissioner Walker stated, citing that improved techniques plus Government regulation have been largely responsible for the more than 70 percent reduction in long-distance telephone rates from 1934 to the present time. (He noted that in 1934 the New York-San Francisco station-to-station day rate for 3 minutes was $9.00 as compared with $2.50 at present.) Just as in past addresses, Commissioner Walker stated that the present $2.50 rate might possibly be cut to less than half with a maximum station-to-station rate of $1.00 for the entire United States. He added that the improvements in the art have found widespread application in international communications, which was illustrated by the fact that in 1927 a New York-London telephone call cost $75.00 and now costs $12.00.

"We are all interested in developments which may lead to improvements in exchange service and in reductions of exchange rates," Commissioner Walker brought out significantly in perhaps a suggestion to the State commissions about exchange rates. He stated that exchange service and long-distance communication are necessarily interwoven.

The FCC Commissioner, then gave credit to the Bell Laboratories and the telephone companies as generally being cognizant of the problem of making exchange service more easily accessible, particularly to rural people and to low-income urban dwellers. "Whether exchange service is subject to the same degree of improvement as long-distance service may be another question," Commissioner Walker said. "But an urgent need of the times is for a more widespread extension of exchange service to those who do not now have it."

Commissioner Walker gave an interesting summation of the developments in radio. He cited the Citizens' Radio; general mobile service, including service for inter-city truck and buses and aviation; railroad radio, which should greatly improve rail service, reduce the hazards of travel and save life and property; FM broadcasting; and television. In the case of television he said it is not visionary to predict that in the future television as well as facsimile may be combined with telephony. Radar, which had so much to do with winning the war, will have important peacetime applications in aviation, train and motor vehicular travel. Another fascinating development, he noted, was visual speech. In regard to mobile telephony, motorists, bus and truck drivers can call their telephone numbers by simple contact with the operators. All these new developments and improvements will be a real challenge to industry to make them available as speedily as possible, Commissioner Walker stated, but it will be no less a challenge to Government, and both Federal and State commissions will have increasingly heavy responsibilities as the communications industry expands.

DEAD ACCURATE
EASY TO USE

Takes out guesswork of "sight and sag", or oscillation wire stringing. Hooked on in a jiffy. Indicates tension in seconds. Measures only 8¼" x 6¼" x 3". Capacities 500 to 20,000 lbs.

A Lot of Critical Testing to Do

MAKE SURE WITH THE
DILLON
DYNAMOMETER

The Dillon is universally used in telephone work. Accuracy, and long-lived dependability are the answers. Indicates exact tension in guy strand, messenger and wire.

Many other uses where pull, torque, weight or overload are vital factors.

Write, wire or phone for illustrated Dynamometer Manual.

W. C. Dillon & Co., Inc.
5410 W. HARRISON ST., CHICAGO 44, ILL.

Technical Developments in the Telephone Field

(Continued from page 33)

Fig. 15 — Kamo portable electric earth auger in operation.

Telephone Service Via Power Lines

In seeking more economical ways to furnish telephone service to farmers it is natural that the use of carrier on rural power lines would be considered. Much progress has already been made in developing carrier systems which will work on rural power lines. Experimental research conducted in this field just prior to the war has not been resumed.

Some of the problems inherent to furnishing telephone service over a power line to a rural subscriber which have been encountered in the priminary experiments are:

(1) It has not been found feasible to electrically couple the farmers *carrier telephone* to the power line by merely plugging into the 110 volt power receptacle on the farmer's wall. This was not a pleasant discovery as it meant that relatively expensive coupling equipment would be required to get the carrier current from the farmer's special telephone on to the power line.

(2) Experiments have indicated that some type of wave trap or choke coil will be required at all transformer points and in some cases in branch power lines to lower the shunting and absorption effect of these connected units and lines.

(3) Electro-static coupler units will also be needed at the point at which the carrier current from the rural subscriber's telephone is picked off of the power line and placed on a telephone line leading to the control office.

In spite of these difficulties and others which may appear in the picture, there will probably be available within a few years or less carrier telephone systems designed for application to rural power systems. As to what their cost may be and the economies which they may offer as compared to wire lines, I am unable and unwilling to hazard a guess.

There is considerable enthusiasm for this method of handling our rural problem, particularly on the part of the REA who undoubtedly would like to get into the telephone business. Personally, I do not believe the carrier principle is the answer to our rural telephone problem.

Plastic Drop Wire

A plastic drop wire which is now avavilable may ultimately completely replace the impregnated textile braid type of drop wire which has been in common use for many years. I recently had the

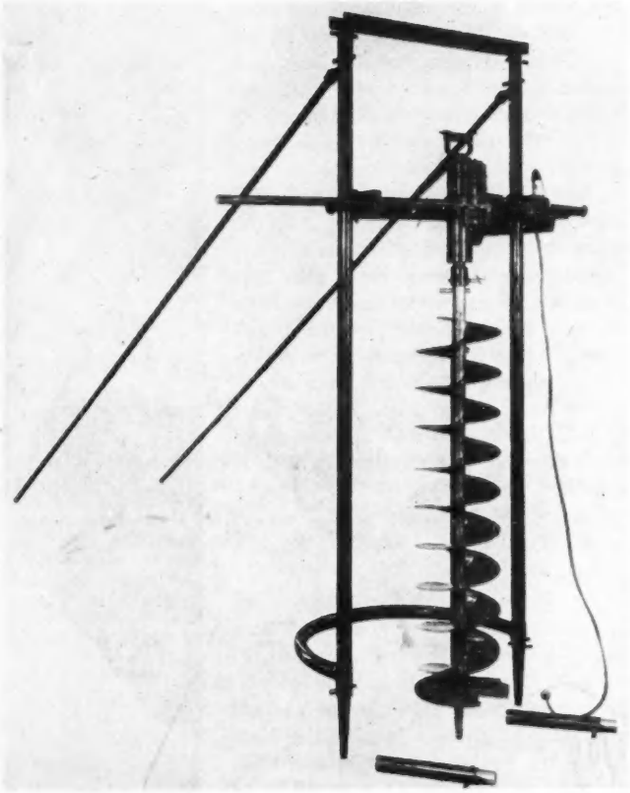


Fig. 16 — New Kamo drill support attachment which holds the drill and then lifts it from the hole with a small elevator motor.

opportunity of inspecting approximately 10,000 feet of plastic drop wire that has been in service for approximately a year. Where this wire passed through trees it showed little bad effect from the abrasive action of the tree limbs which had been rubbing against it. It had not sagged or stretched to any appreciable extent. It looked neat and uniform and presented a much better appearance at the terminal pole than the heavier and bulkier old type wire.

The surprising thing about the plastic drop wire which I inspected was that it contained No. 17 gauge soft copper conductors instead of the hard drawn conductors normally used with drop wire. The strength of this drop wire depended on its plastic covering rather than on the wire conductors. It should, of course, be feasible to make plastic drop wire with hard drawn conductors which should result in a drop of greater strength than ordinary drop wire.

Interior wire of the plastic type is also available. Like the plastic drop wire it is characterized by its small outside diameter and smooth appearance. The cost of plastic wire is not substantially higher than the ordinary variety. It is too early to predict whether or not it may ultimately replace the types of wire now in general use. Put up a few thousand feet and watch it carefully, that's the way to find out.

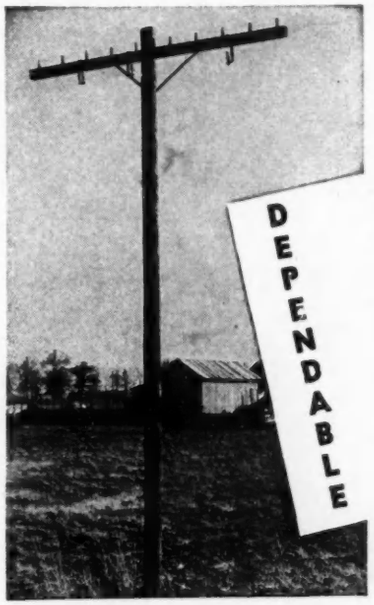
Automatic Toll Ticketing

Some prophets have predicted that eventually all toll calls would be on a complete nationwide subscriber to subscriber dial basis with ticketing accomplished by automatic printing equipment.

But in looking to the future in a somewhat skeptical frame of mind I cannot help but come to the conclusion that automatic toll ticketing and subscriber toll dialing will, for a number of years at least, be confined primarily to short haul fixed rate city to suburban type calls. I base this conclusion on the fact that operator assistance would be required on most long haul calls for number information and to supervise transmission; hence, ticketing the call does not constitute much of an added burden.

Automatic toll ticketing does have possibilities and will be used in some of the larger metropolitan exchanges where a large volume of calls are handled to inner and outer suburban exchanges on a flat rate message basis. As most of you know, there are now two automatic ticketing installations in service in the United States. One of these is the Bell installation at Culver City, California, and the other that of the Associated Telephone Company at Santa

STROMBERG-CARLSON
Recommends...



"DEPENDABLE" CROSS-ARMS
MADE BY:
American Cross-Arm, Inc.

The best quality cross-arms you can buy.

AVAILABLE IN:
- Douglas Fir
- Creosoted Yellow Pine
- Gulf-Red Cypress

For sturdy, well-seasoned cross-arms, specify "DEPENDABLE"

available for prompt shipment.

ARMSTRONG'S
WHITALL TATUM
GLASS INSULATORS

USED THE WORLD OVER

ARMSTRONG'S Glass Insulators give dependable service whether the temperature is a sizzling 134° F. or a frigid 92° F. below zero. Their homogeneous glass withstands *all* weather conditions.

Every stage of production is automatically controlled to assure uniformity. Pin cavities are accurately gauged for a true pin fit.

The crystal-clear glass is free of flaws. Tests show their transverse strength exceeds that of supporting pins.

For service free of thermal breakage or structural failure, specify ARMSTRONG'S "Whitall Tatum" Glass Insulators.

Conform to or exceed A.S.T.M. standards

STROMBERG-CARLSON COMPANY
PROGRESS IN TELEPHONY

Factory and General Offices: Rochester 3, New York, U.S.A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

THE MODERN INSULATION...THERMOPLASTIC

Thermoplastic insulation specialists . . . producing a complete line from fine wires to heavy power cables . . . serving: Public Utilities, Radio, Electronic, Appliance and Instrument Manufacturers, Telephone Companies and Contractors.

We specialize in thermoplastic insulated wire and cable designed and engineered to meet the highest electrical standards for your particular type and service. Write for complete information about our new compounds and constructions which incorporate maximum resistance to heat, flame, oxidation, chemical action, oil, grease, moisture, cold, abrasion, fungus growth and other severe conditions. Remember . . . when you're thinking of PLASTIC you're thinking of US!

PLASTIC

WIRE & CABLE *NORWICH CONN*

CORPORATION

Monica, California.

Automatic ticketing is not an appliance that you purchase and attach like you would a new accessory for your automobile. It requires a formidable array of relays, switches and other equipment in addition to the basic mechanism which actually prints the ticket. I think we can safely conclude that automatic ticketing is a method that is unlikely to have much application in our smaller exchanges for some time to come and but limited use in our larger exchanges in the near future.

Errata Note—In the preceding section of this article an example of a toll call from Lincoln, Nebraska to Washington, D. C. under the nationwide switching plan was given. Through an oversight three digits were omitted from the area and office code. The example should have given the six digit office and area code No. 419613 instead of 419.

Stromberg-Carlson Appointment

Lloyd L. Spencer, vice-president and general sales manager of the Stromberg-Carlson Company, has announced the appointment of G. S. (Jerry) Gill as sales manager of the company's government surplus materials department.

G. S. Gill

Mr. Gill recently resigned the post of deputy chief of the program planning section of the communications section of the War Production Board. His Washington wartime post supplemented a second full-time job, that of president and general manager of the Cass County Telephone & Telegraph Company, Virginia, Ill.

STROMBERG-CARLSON
RECOMMENDS—

POLES
Bearing this Trade Mark

MTCo

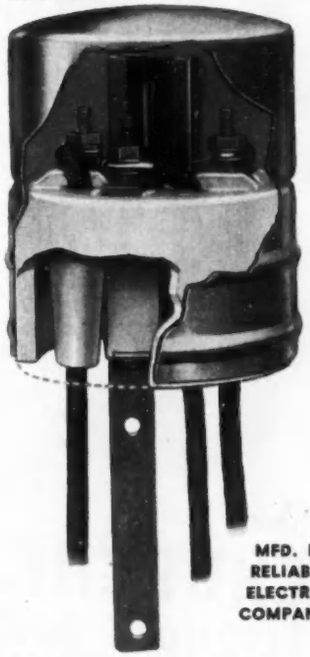
"The Stamp of Character"
Product of

T. J. MOSS TIE COMPANY

Poles bearing this trade-mark are your guarantee of the highest quality creosoted southern yellow pine poles.

Every pole bearing this mark is completely supervised from tree to consumer by men experienced in the industry.

RELIABLE 402RR
DRY SPOT LIGHTNING ARRESTER



MFD. BY RELIABLE ELECTRIC COMPANY

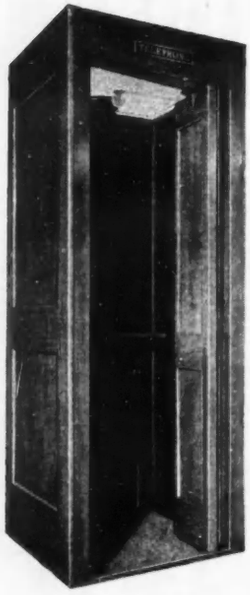
The Reliable No. 402RR Dry Spot Lightning Arrester may be used on long communication lines which are connected to numerous stations without materially lowering insulation resistance of the lines. Even under worst conditions, in addition to providing several inches of dry braid inside the arrester, the 402RR will interpose not less than 2⅝" of glazed porcelain between the wet covering of the line and ground wires. Reliable Self-cleaning Sawtooth Discharge Blocks are used to drain the line of static without danger of accidental grounding. Surface insulation between metal parts has been increased by barriers. These and other features prove it true economy to specify Reliable 402RR arresters always.

Over 35 years' service to the utilities.

STROMBERG PROGRESS IN TELEPHONY CARLSON

STROMBERG-CARLSON COMPANY
Factory and General Offices: Rochester 3, New York, U. S. A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

STROMBERG-CARLSON RECOMMENDS...



The
CHURCHILL TELEPHONE BOOTH

An Invitation to Use the Pay Station

Operating companies have found the **CHURCHILL** No. 100 Folding Door Telephone Booth a builder of pay station business.

It is constructed as a single unit and equipped with a reinforced back panel for mounting a wall telephone or coin collector.

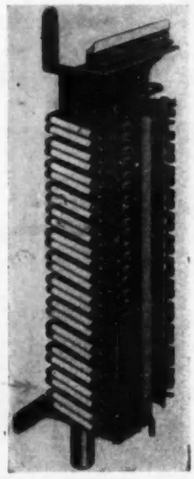
The **CHURCHILL** Booth is made of selected white oak and is available in light or medium oak in a satin finish.

Included as standard equipment are electric light and automatic electric ventilator.

Overall height is 84¾"; width, 29"; depth, 30½". Shipped knocked down and crated.

Illustrated literature available.

TOP PROTECTION A-1 PERFORMANCE



with the **COOK** TYPE T MAIN DISTRIBUTING FRAME

The Type T is especially designed for the protection, termination, distribution, and cross-connection of paper-wrapped, lead-covered cable. This eliminates time-consuming splicing of silk and cotton covered cable.

The Type T comes with a moisture-proof, roomy, but compact steel corebox with a rubber gasketed steel cover conserving space and facilitating installation and handling. The famous COOK self-soldering nozzle insures tight joints. Meet high quality performance specifications at reasonable cost.

COOK ENGINEERING GUARANTEES TOP PERFORMANCE

STROMBERG PROGRESS IN TELEPHONY CARLSON

STROMBERG-CARLSON COMPANY

Factory and General Offices: Rochester 3, New York, U.S.A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

New Rate Reductions

The American Telephone and Telegraph Company announced November 30 that reductions in rates for interstate services amounting to over $20,000,000 annually have been agreed upon with the FCC to be effective February 1, 1946.

Approximately $17,500,000 of this reduction is in long distance telephone rates, principally for distances between 340 and 2140 miles.

Rates for teletypewriter exchange service for distances of more than 350 miles will also be reduced about $1,000,000 annually.

In addition, rates for private line telephone, teletypewriter and telephotograph are also being reduced at the longer hauls with savings to the users of these services of approximately $1,700,000 annually.

In commenting upon these reductions, Walter S. Gifford, president of A.T.&T., said that they had been occasioned by discontinuance of accruals to the Company's employment stabilization fund. These have been made since the latter part of 1943 to take care of maintenance expenses which would have been incurred during the war years had it not been for lack of manpower and materials. Viewing Bell System earnings as a whole, he said there is nothing in the present or near future outlook that would justify any rate decreases whatever; in fact, the level of the System's earnings in recent years has been the lowest in its history, except for the worst years of the depression. However, the reductions were made on the showing of the interstate traffic by itself which is under the exclusive jurisdiction of the FCC. Earnings on the interstate portion of the business have been abnormally affected by the extraordinary volume of long distance calls and by the temporary overloading of the long distance plant.

Mr. Gifford also stated that looking to the future he was pleased with the Commission's appreciation of the tremendous postwar program which lies ahead of the Bell System companies. This program may well mean securing over $2,000,000,000 in new money during the next decade and will require adequate earnings for the System as a whole if the program calling for more jobs, more materials and better service is to be accomplished.

Company Changes Hands

The property of the Poplar (Wis.) Telephone Company, on approval of the public service commission, was sold last month by Arthur Sedin to Eugene Nevin for $7,000.

Company to Use Radio Circuits

An Indiana radio manufacturer, it is reported, has been authorized by the FCC to install and operate radio transmitting and receiving apparatus for use as talking circuits in carrying on the company's business between its Indiana factories and its Chicago office. It is understood that two frequencies have been allocated to the company and that the equipment is capable of reaching points much farther away than Chicago. These radio channels will supplement telephone channels formerly used.

Stromberg-Carlson New Branch Manager

Arthur B. Preble

Arthur B. Preble, a veteran of more than thirty years with the Stromberg-Carlson Company, has been appointed telephone sales manager of the company's Kansas City (Mo.) branch office, it was announced November 26 by T. C. Thompson, telephone sales manager of the fifty-one year old communications firm.

With Stromberg-Carlson, Mr. Preble has been successively an installer, installing foreman, a sales representative in the midwest and far west, and sales engineer in the Kansas City branch.

Service Ordered Improved

The Wisconsin Public Service Commission has ordered the Dodgeville (Wis.) and Union Mills Telephone Company to improve its service to 72 rural users by July 1, 1946.

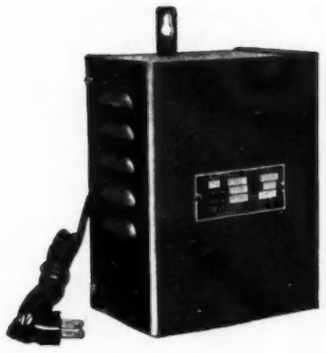
The company was ordered to reconstruct and metalize its lines, at an estimated cost of $5,000, as a result of complaints of a third of its subscribers.

STROMBERG-CARLSON
Recommends...

ELECTROX RECTIFIER

Type PA-05004
with Power-off Relay

Mfd. by
Schauer Machine Co.



Operator's circuit is automatically transferred to stand-by dry cells in case of power failure. Operates direct from 110 volt, 60 cycle lighting circuit . . . delivers smooth, constant, direct current to operator's circuit on magneto switchboard. No hum; no interference.

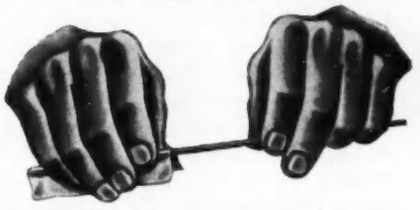
- Low First Cost
- Low Operating Cost
- Dependable Service
- Long Life

Write for Descriptive Circular 443

Nicopress

SPLICING SLEEVES FOR MAKING FASTER LINE SPLICES

1. CLEAN end of wire



2. INSERT wire in sleeve

3. COMPRESS with *Nicopress* Tool

Simple ISN'T IT!

STROMBERG-CARLSON COMPANY
Factory and General Offices: Rochester 3, New York, U.S.A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

Telephone Engineer's RADIO COURSE FOR TELEPHONE MEN

Chapter 9
Section 2

Basic Theory of Amplitude Modulated System

By B. C. BURDEN
Technical Consultant
Lincoln, Nebraska
All Rights Reserved

Theory of Plate Modulation

In the plate modulating system, the audio modulating voltage is applied to the plate circuit of the R. F. amplifier tube. There are two systems of plate modulation in common use, viz.; the *Heising system*, and the *modified Heising* system. Inasmuch as the modified Heising system is in most general use it will be discussed first.

The basic circuit of the *modified Heising system* is shown in Fig. 122. For purposes of clarity only the modulating tube and the modulated R. F. amplifier are shown. The oscillator signal is applied to the grid of the R. F. amplifier tube through inductance L1. C1 bypasses the R. F. around the bias battery. Plate voltage to the modulated amplifier is supplied by battery B2 in series with secondary of transformer T1 and L2. The output of the modulator tube feeds into the primary of the modulating transformer T1. The gain of the modulator tube is adjusted so that at peak output the audio voltage developed in the secondary T1 just equals the voltage of the plate battery B2.

For purposes of discussion, assume that the plate battery B2 has a potential of 1000 volts and with no audio signal impressed the R. F. current developed in L3 is two amperes. Now assume that an audio signal is applied to the grid of the modulator tube and that the resultant voltage developed in the secondary of transformer T1 is on the positive half cycle. Since the voltage developed in T1 is in series with the plate battery B2, the voltages add directly and if the modulator tube is at the instant delivering full output, the total voltage on the plate of the R. F. amplifier will be 2000 volts. The increased plate voltage will result in the R. F. current increasing to four amperes.

On the next half cycle of the audio signal, the voltage developed in T1 will be negative. Again, if the audio modulator tube is delivering full output, the negative voltage developed in T1 will just equal the positive voltage B2 and the net plate voltage of the R. F. amplifier tube is zero, and the output current is zero, (1000-1000=Zero.) As a result of this action, the R. F. output wave developed in L4 is amplitude modulated in accordance with the audio signal applied to the modulator tube.

The Heising Plate Modulation System

The second type of plate modulation that can be used on radio transmitters is the basic Heising plate modulation or constant current modulation system, as shown schematically in Fig. 123. In this system both the R. F. amplifier and the modulator tube receive plate voltage from the common plate supply B3 in series with choke L5. Choke L5 is of special construction designed to have high inductance so as to oppose any change in the current flowing out of the plate supply B3. Hence, under the condition when no signal is applied to the modulator tube, plate current flowing out of B3 divides between the modulator tube and the R. F. amplifier. When an R. F. signal is impressed on the grid of the R. F. tube through L1, a constant R. F. voltage is developed in L4.

Now assume an audio signal is applied to the modulator tube of such polarity as to make the grid of this tube more positive. This decrease of bias on tube 2 requires that a greater plate current flow in this tube. However, choke L5 prevents a greater current flow out of battery B3, hence the plate current in tube 2 can increase only at the expense of a decrease of plate current in the R. F. tube 1. As the plate current flowing through R1 decreases, the plate output voltage developed by tube 1 decreases, and as a result a smaller R. F. voltage is developed in L4.

When the audio signal impressed on the grid of the modulator tube reverses so the grid of tube 2 is made more negative, the plate current in this tube decreases. Again the choke L5 prevents any change or current flowing out of the battery B3, and as a result the plate current of tube 1 must increase. The increase of plate current results in an increase of R. F. voltage developed in L4. Thus an audio signal applied to the grid of the modulator tube produces amplitude modulation of the R. F. signal flowing through the R. F. amplifier.

It will be noted that the battery voltage B3, the choke L5 and the grid bias on the modulator and R. F. amplifier must be carefully adjusted if 100% modulation is to be attained. You will recall that for 100% modulation, the negative half cycle of the modulating signal must reduce the output of the R.F.

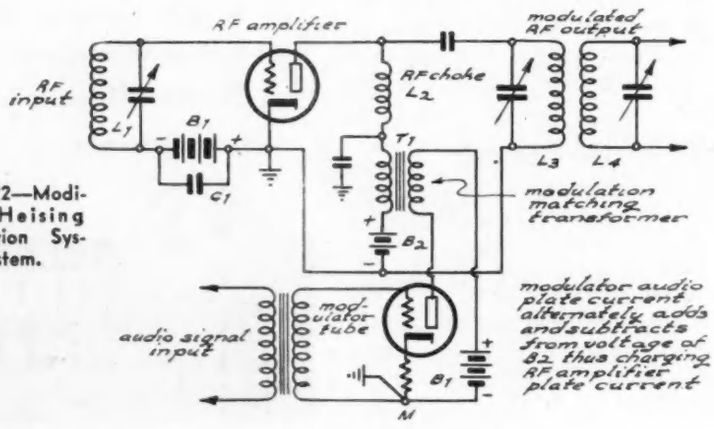


Fig. 122—Modified Heising modulation System.

30 Copperweld YEARS OF PROGRESS

IN MAKING COPPER-COVERED STEEL WIRE

The Copperweld Trade Mark, for over 30 years, has been the symbol of sound engineering and quality workmanship in copper-covered steel wire. Constant research has resulted in higher tensile strengths and other refinements in manufacture—but the basic principle behind all Copperweld products—the molten welding of a thick protective covering of copper to a core of high-strength alloy steel—has never had to be changed. More than thirty years of dependable performance attest the soundness of this exclusive Copperweld process.

You can always depend on Copperweld wherever you need a high quality wire with the strength of steel and the conductivity and rust-resistance of copper.

If you haven't received your copy of our 30th Anniversary Brochure write for it today.

Only Copperweld Wire Gives You All These Advantages

1 HIGH STRENGTH
2 RUGGEDNESS
3 HIGH CONDUCTIVITY
4 SMALL DIAMETER
5 PROTECTION AGAINST RUST
6 HIGH MELTING POINT
7 EASY HANDLING
8 LOW OVERALL COST

COPPER ALLOY STEEL

and Copperweld is the only wire made by the Molten-Welding Process

COPPERWELD STEEL COMPANY
GLASSPORT, PENNSYLVANIA
Sales Offices in Principal Cities

COPPERWELD WIRE • STRAND • GROUND RODS • SIGNAL BONDS

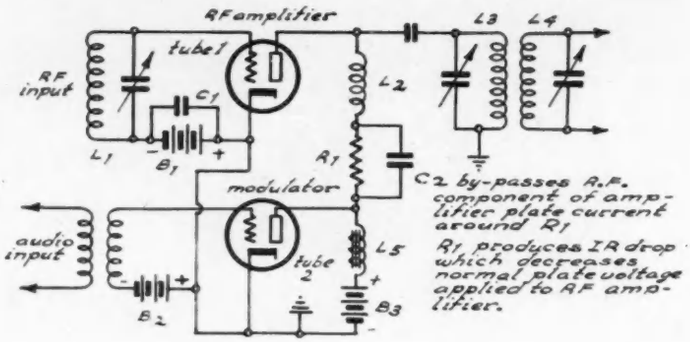


Fig. 123—Original Heising plate modulation system.

amplifier to zero. In order to obtain 100% modulation with the basic Heising system, the plate current of the R. F. tube must be reduced to zero when the modulator plate current is maximum, which requires that the R. F. amplifier be operated at a lower plate voltage than the R. F. tube. Resistor R1 is used to reduce the d-c plate voltage of the R. F. tube. In order to obtain this condition, the grid bias of the modulator tube must be carefully adjusted so that the maximum plate current taken by the modulator tube just equals the normal flow of current through the choke L5.

This system is not nearly as popular as the modified Heising system, and is seldom used.

Comparison of the Grid and Plate Modulation Systems

A study of the plate modulation systems just described shows that a large audio signal is required to produce complete modulation of the R. F. wave. That is, the magnitude of the audio signal applied to the plate circuit of the modulated R. F. amplifier must equal the normal plate voltage of the R. F. amplifier tube if 100% modulation is to be obtained. This type of modulation therefore is called *high level modulation*, and is characterized by the large amount of audio power required. It can readily be shown that if plate modulation takes place in the last amplifier stage of the transmitter, the audio modulator must develop about as much power as the R. F. amplifier delivers.

In the grid modulating system, the audio signal is applied to the grid of the R. F. amplifier, hence the magnitude of the audio voltage required is considerably smaller than that required in the plate modulating system. For this reason the grid modulating system is frequently called *low level modulation*. At first thought it would seem that low level modulation would be preferable in view of the low audio power required. However, the radio frequency amplifiers used in low level modulation must be carefully designed if good fidelity is to be obtained with this type of transmitter. The R. F. amplifier must be operated with linear characteristics, which necessitates the use of Class B amplification with its relatively lower efficiency. A grid modulated power tube has an output of only 25% (approx.) of its output as compared with plate modulation.

In transmitters using high level plate modulation, the R. F. amplifiers including the modulator stage can be the high gain, high efficiency amplifiers using sharply tuned circuits, since these amplifiers must pass only the carrier frequency. The high cost of the high power modulating equipment is in part affected by the reduced cost of the R. F. amplification. The cost of the complete transmitter for each type of modulation is comparatively equal. The choice between the two types of transmitters lies largely in the discretion of the design engineer and the type of program which is to be broadcast. Both systems are in common use in broadcast transmitters. Fig. 124 illustrates the basic difference between the two systems.

High quality stations using high power (5000 watts and over) are usually a combination of the two systems. That is, these stations using plate modulation usually modulate in the stage preceding the final output power amplifier. By this procedure only the final output amplifier needs to have linear characteristics and the audio power required does not have to be as great as the total radiated power. Grid modulation transmitters may modulate in the final stage or in the stage preceding the power output stage.

Cathode Modulation System

In the *cathode modulation system* the audio signal is inserted in the cathode circuit of the R.F. tube to produce modulation of the R.F. signal. Cathode modulation permits slightly greater carrier efficiency than the grid modulation method. With cathode modulation the carrier efficiency can be made slightly in excess of 50% as compared to something less than 35% for the grid modulation method. Cathode modulation requires an audio power slightly greater than a comparable grid modulation system but has the advantage of being less critical in adjustment.

The basic system of a cathode modulating system is illustrated in Fig. 125. The R.F. modulated amplifier is conventional in design except the cathode returns to ground through the secondary of the audio transformer, and the grid is biased to approximately three times the plate current cut-off value. The R. F. input signal is coupled to the grid of the R.F. tube through inductance L1, the lower end of L1 being connected to the negative terminal of the bias battery B2. Condenser C1 by-passes the R.F. out of the bias supply while the high capacity condenser C2 prevents the audio signals in the secondary of the transformer from being impressed on the bias source.

Theory of Operation

When no audio signal is impressed on the audio transformer, the cathode of the tube is at ground potential from a d-c standpoint and the gain of the modulated tube is constant. The magnitude of the signal is controlled by the values of the steady grid bias and plate voltage, hence the R.F. signal developed in L2 is constant in amplitude. Now, if an audio signal is impressed on the audio transformer on the positive half cycle, the cathode of the tube is driven positive with respect to ground and since this voltage is in series with the bias battery B2, in effect the grid is made more negative with respect to the cathode, thus the plate current of the tube is reduced. At the same time the effective plate to cathode voltage of the

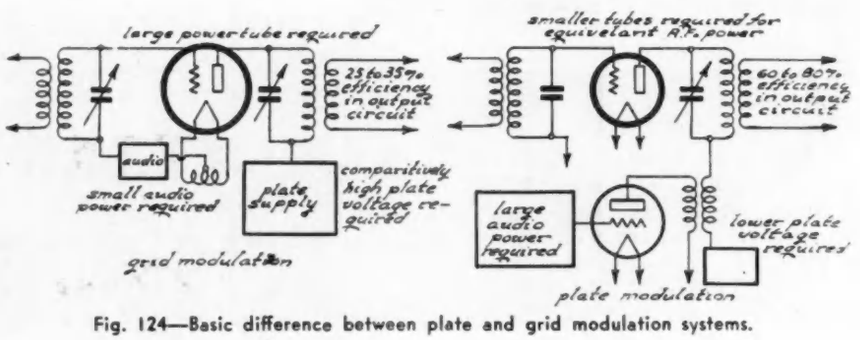

large power tube required
25 to 35% efficiency in output circuit
audio
small audio power required
plate supply
comparitively high plate voltage required
grid modulation
smaller tubes required for equivalent R.F. power
60 to 80% efficiency in output circuit
large audio power required
lower plate voltage required
plate modulation

Fig. 124—Basic difference between plate and grid modulation systems.

tube is decreased by the value of the audio voltage across A-B which still further reduces the plate current of the tube, thus reducing the R.F. output.

On the negative half cycle of the audio input, end A of the audio transformer becomes negative. This makes the cathode more negative, thus reducing the effective bias from grid to cathode, resulting in an increase in the plate current. Under these same conditions, when the cathode is negative, the effective plate to cathode voltage is increased by the amount of the audio voltage across A-B. This increase of plate voltage results in a still greater increase of plate current with a corresponding increase of R.F. output in L2.

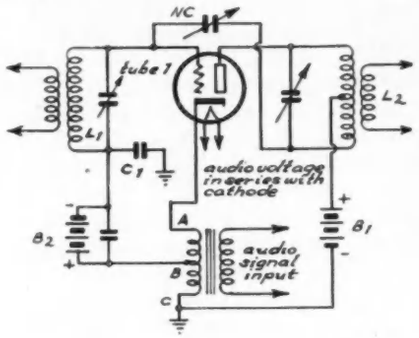
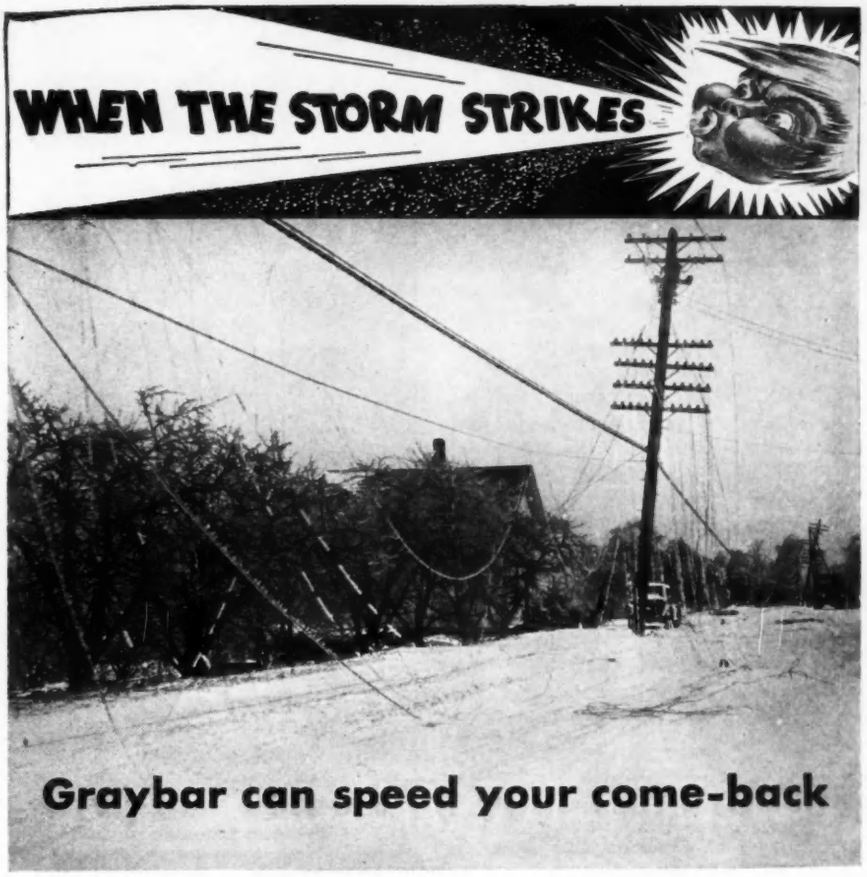


Fig. 125—Schematic of cathode modulation system.

The net result of the cathode system of modulation is to increase the R.F. output of the modulated tube on the negative half cycle of audio current by increasing the effective plate voltage and decreasing the grid bias. Conversely, on the positive audio half cycle the effective plate voltage is reduced and the effective grid bias increased thus reducing the R.F. output of the modulated tube and producing modulation of the R.F. signal. The cathode system of modulation is essentially a combination of the grid and plate modulation systems in that the audio signal affects both the grid bias and the plate voltage. The increased efficiency of this system over grid modulation is realized because of the plate voltage variations produced by the signal.

Operating Adjustments

It is interesting to note that the cathode of modulation utilizes both available methods of changing plate current, viz., that of varying plate potential. In high-mu vacuum tubes a given percentage change of grid voltage is much more effective in producing a plate current change than a comparable change in plate voltage. Since it is desirable that plate and grid have comparable effects on the plate current of the modulated tube, the cathode modulation system makes provisions for applying a



LINES down! Replacement items urgently needed. Can Graybar supply them? Yes — because we've had years of experience in meeting emergency demands, and because Graybar maintains stocks of essential telephone supplies at more than eighty warehouses — strategically located throughout the nation. And Graybar men are always on call to speed these supplies to wherever you need them — day or night — to meet any emergency.

Should use of alternates for any items be necessary, Graybar's Telephone Specialists have the technical knowledge to suggest satisfactory ones. Should the emergency isolate any Graybar warehouse, another can supply what's needed.

The same resources that enable Graybar to render outstanding emergency-service are at your disposal *always* — offering you local delivery of first-quality telephone supplies. You'll find it pays to give the nearby Graybar man the responsibility of meeting *all* your requirements. *Graybar Electric Company, Graybar Building, New York 17, N. Y.*

4580

Via GraybaR
First Source of Telephone Supplies

IN OVER 80 PRINCIPAL CITIES

larger portion of the audio signal to the plate when high-mu tubes are used. This is accomplished by returning the positive terminal of the bias supply to one of several taps on the audio transformer as shown in Fig. 125.

Design Considerations

For proper operation of the audio modulating amplifier, the audio output transformer must be chosen so that the "cathode impedance" across AB produces the proper load on the audio tubes. This condition will be realized if the "cathode impedance" is considered as 10% of the plate impedance. The plate impedance of the modulated R.F. tube is found by dividing the plate voltage of B1 by the normal d-c plate current of the R.F. modulated tube. Thus, if the plate voltage is 1000 volts and the normal plate current of tube No. 1 is 200 m.a. when no audio signal is applied, then the plate impedance is 1000 divided by 0.2 equaling 5000 ohms and the audio output transformer should be adjusted for 500 ohms impedance from A to C. The secondary winding A-C must be capable of carrying the full d-c plate current of tube No. 1.

(Part 1 of Chapter 10 will appear in the January 1 FORTNIGHTLY TELEPHONE ENGINEER.)

Examination Questions Chapter 9—Basic Theory of Amplitude Modulated Systems

1.—Explain the basic theory of amplitude modulation.
2.—What is meant by the term "Percentage of Modulation?"
3.—Explain the difference between grid modulation and plate modulation systems.
4.—What is the effect on the output quality if a radio transmitter is over-modulated?
5.—What are the upper and lower side band frequencies of a radio transmitter with carrier wave of 2000 kilocycles and which is modulated by an audio signal of 3500 cycles?
6.—What are the relative advantages of grid and plate modulation systems?
7.—Explain the action of the cathode modulation system.
8—Why is the measurement of transmitter frequency an important function of the operating engineer?

A "HOT TIP"

FOR BETTER SOLDERING —

"American Beauty"

SOLDERING IRONS

American Beauty construction assures ample heat at the tip of your iron. Interchangeable copper tip fits into a solid steel core inside the heating element; heat floods quickly through the steel core to give you constant heat—a "hot tip" when you need it.

From the 50-watt lightweight to the 550-watt heavyweight, there's an American Beauty for every soldering job. You'll find them all in the Automatic Electric Catalog.

RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC SALES CORPORATION

1033 WEST VAN BUREN STREET, CHICAGO 7, ILL.

L. F. Roberts Joins Staff Of Telephone Services Inc.

Announcement has been made by V. E. Chaney, president of Telephone Services Inc., that Leon F. Roberts, who for the past five years has been commercial manager for the Jamestown Telephone Corporation, Jamestown, New York, resigned his position on December 1, to join the staff of Telephone Services Inc., operating service center for domestic telephone companies of the Gary Group.

Mr. Roberts will make his headquarters in Chicago, and will act in a staff capacity on commercial and public relations matters for telephone companies of the Telephone Bond and Share system, which comprises Gary Group operating companies serving nearly 350,000 stations in seventeen states.

Mr. Roberts has become well known throughout the Independent telephone industry through his work for the Jamestown Telephone Corporation, and through his activities in association affairs, particularly as chairman of the advertising committee of the United States Independent Telephone Association. A former newspaper man, popular public speaker, and leader in civic and political affairs, he brings to his new duties a unique background of experience in public relations activities and techniques.

A native of Indiana, Mr. Roberts spent his boyhood in Panama, later going to Jamestown, where he attended Lakewood High School and Jamestown Business College. His early business career was devoted to the newspaper field, in which he served in various editorial capacities for newspapers in several cities in Pennsylvania. For several years he served as city hall reporter for the Jamestown Evening Journal.

His career in the political field began in 1931 when he was appointed a member of the Jamestown city council, to which he was later elected for a two year term. In November, 1933, he was elected mayor at the age of 34, at that time being the youngest mayor in the state of New York. After an interlude as field representative and sales manager for the Jamestown Mutual Insurance Company, he was re-elected mayor in 1939 by the largest majority ever recorded in Jamestown history up to that time.

Mr. Roberts voluntarily retired as mayor on January 1, 1941, to become associated with the Jamestown Telephone Corporation as commercial manager. His commercial and public relations work for that company has attracted wide attention for its outstanding character and effectiveness. Acting on the

Leon F. Roberts

principle that a well-informed public is the best protection that any telephone company can have, he has consistently kept the Jamestown telephone users informed about the problems which the company has faced and the steps which have been taken to resolve those problems. One of his contributions in this direction has been the weekly column which he prepared and which was published in the Jamestown Post-Journal under the sponsorship of the telephone company.

It is characteristic of Mr. Roberts' keen sense of public responsibility that he has always been active in civic and business organizations. Since retiring as mayor he has served as a member of the Municipal Airport Commission, as a member of the Board of Education, a leader in war bond drives, and president of the Civil Service Commission. He is also a past president of the Jamestown Advertising and Sales Club.

Sir Raymond Birchall Made Director General

Sir Raymond Birchall, chairman of the United Kingdom Delegation at the Bermuda Conference, received notification during the conference of his elevation to the post of Director General of the British General Post Office as of January 1. Sir Raymond, who is one of the ablest telecommunications officials in the British service, has for a number of years been Deputy Director General of the General Post Office. Since Sir Stanley Gardiner, the Director General, was detailed from the Post Office to head the Home Security organization in Great Britain, Sir Raymond Birchall had been doing most of the work and has been the de facto Director General.

WHITNEY BLAKE

WB

WELL BUILT WIRES SINCE 1899

Change No. 19 and 22
INSIDE TELEPHONE WIRES
TO
PLASTITE*

Order by
WHITNEY BLAKE
Catalogue No.

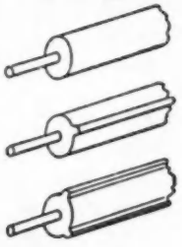
No. 19 Twisted Pair
Brown or Ivory—19PN-2

No. 19 Triple
Brown or Ivory—19PN-3

No. 22 Twisted Pair
Brown or Ivory— 22PN-2

No. 22 Triple
Brown or Ivory— 22PN-3

Raised Ridge in Insulation for Polarity



THE RIDGE shown in the enlarged section is extruded on one leg of a twisted wire where both are the same color. This ridge makes tracing easy in darkness or in light. The third leg of a triple wire has two ridges.

* Reg. U. S. Pat. Office

PLASTITE*
Insulated Inside Telephone Wire is —

1. Small Diameter. Makes a neater job on inside wiring.
2. Colors are bright and permanent, easier to see.
3. Strips Cleanly and Easily.
4. Practically Ageless.
5. Trouble Free Installations.
6. Flame Proof.
7. Lower Cost.

A TRIAL ORDER of this bright, smooth extruded PLASTITE* Insulated Wire will convince you that it is the ideal Inside Wire.

Order Now for Prompt Shipments.

Ask GraybaR for Prices and Samples

GraybaR Distributed by GraybaR Electric Company

The WHITNEY BLAKE Company
New Haven, Connecticut, U. S. A.

Stromberg-Carlson Has Convincing Salesman

MOLLANDS' STORY

the dunk test . . . the bounce test . . . recovery . . . the Moon shines bright.

WILLIAM "Moon" Mollands, Stromberg-Carlson sales representative, has a unique method of selling telephones that is not recommended to the rest of the trade, but which apparently pays dividends to Mr. Mollands as his sales record in the southeastern states indicates.

Mr. Mollands' demonstration of the durability of Stromberg-Carlson phones is most convincing. Before the customer's unbelieving eyes Mr. Mollands dunks the phone base, receiver, and cord into a bucket of water, withdraws them—dripping at every point, slams the entire outfit to the floor or pitches it across the room, retrieves the much abused equipment, and plugs it in to show the customer that the phone works as well as ever.

The ubiquitous Mr. Mollands, challenged one time at a telephone sales convention in Chicago, put all the Stromberg-Carlson eggs into one tremendous heave that carried from the eleventh story of the Stevens Hotel to a parking lot below. Mr. Mollands ran downstairs and dug the phone out of the cinders. Reconnecting the cord which had pulled away from the base, he plugged it in when he had reached his room, and proved that the phone would still speak for itself.

Mr. Mollands modestly admits that this type of convincer is rarely needed. Besides, few southern hotels have 11 stories.

Highlights of the Communications News

(Continued from page 44)

dispute situation which has some potent support—this is important for the telephone industry as it proposes compulsory arbitration for strikes in utilities and public services. All in all, this month may prove a turning point for American labor unionism—the rising tide of public opinion against the current labor turbulence; the first break of the CIO with the Democratic Administration since the beginning of the New Deal; and the increasingly bitter and deep gulf between the AFL and CIO.

Labor

In the telephone field, the dominant union organization—the National Federation of Telephone Workers—has come out with a program of wage increases. The annual Presidents' conference of the NFTW affiliated unions in Milwaukee during the first week in December agreed on a goal of a $2 per week increase for all Bell System employees who belong to the NFTW, but, unlike the CIO and AFL, the NFTW chiefs felt these increases could be effected through reclassification of jobs and shortened progression schedules rather than through outright pay boosts. Most important of the pronouncements in view of the recent Illinois Bell toll operators' strike, was the decision of the NFTW leadership that **no** strikes can be supported by other NFTW unions without the prior approval of the NFTW executive board. This would indicate a definite trend toward greater union leadership responsibility. The NFTW meeting went on record for the 65-cent minimum wage and for a return to the 40-hour work week, but the organization already was on record with Congress on those points so it was nothing significant.

Bermuda Conference

The establishment of a uniform and constructive cable and radiotelegraph rate pattern—a "ceiling" rate of 30c per word and 20c for code for the longest-distance points—was accomplished at the recent Bermuda Telecommunications Conference between the United States and British Commonwealth. The agreements and protocol, achieved at the parley, were created in a spirit of mutual exchange of views and understanding with neither side taking undue advantage but working towards a common goal of sound but lower rates and improved direct radiotelegraph service between the United States and the British Empire, both for commercial business communications and press communications.

Radiotelephone rates and circuits were not touched upon in the Conference. It was understood that **no** differences of opinion arose at any time during the 12-day parley at Bermuda on radiotelephone rates or other

radiotelephone matters. However, it is a most interesting commentary on the Conference that the two key figures in the United Kingdom Delegation were both **telephone men.** Sir Raymond Birchall, the new Director General of the British Post Office, was the leading spokesman on the British Commonwealth side, and Sir Stanley Angwin, chief engineer of the British Post Office, was the principal technical authority of the British group. In addition, most of the representatives from the Dominions were primarily from the telephone side of communications.

In his final statement at the plenary session, FCC chairman Paul A. Porter, U. S. delegation vice chairman, gave an exceptionally fine summation of the results of the conference. He stressed that the better understanding between the United States and the British Commonwealth had evolved a "common philosophy" with "strictly honorable intentions," which will mean the implementation of the broad concepts of communications for world economic stability and peaceful relationships. He paid the highest tribute to the Commonwealth Delegation and particularly to Sir Raymond Birchall, whose broad purposes and rare intelligence "have kept our deliberations upon the highest possible level."

Toll Rates Cut

Another of the perennial rate slashes of the long distance rates of the A.T.&T., due to the termination of the wartime employee stabilization fund reserves, was consummated by the FCC and A.T.&T. through negotiations Nov. 30. The total amount of the reductions, to become effective Feb. 1, 1946, was $20,000,000 annually of which cuts in the rates for calls between 340 and 2140 miles for an aggregate of $17,500,000 per year was the major element. The other reductions came with an estimated $1,000,000 annually in TWX rates, $1,700,000 in private line telephone, telegraph and telephotograph rates; and $1,500,000 in short haul toll calls below 40 miles in distance.

The reduction, which was timed just before the annual NARUC convention, as in past cuts, was termed by A.T.&T. President Walter S. Gifford as **not** justified in view of Bell System earnings as a whole and in view of the Bell System's postwar $2 billion reconversion program. (But the FCC throughout its regulatory history has been setting apart the Long Lines Department just as State Commissions do in the case of Bell

HUBBARD

HUBBARD PRODUCTS INCLUDE

ANCHORS and RODS
BOLTS CLAMPS
BRACKETS BRACES
GUY GUARDS and STRAPS
GUY WIRE PROTECTORS
NUTS and WASHERS
SEATS SHIMS STEPS
SCREWS FIXTURES

—and hundreds of other hardware items for pole line construction

Comments like that—which you hear from telephone men everywhere—are common for Hubbard Pole Line Hardware.

Over a long span of years the men who service the vital telephone lines of our country have come to look upon Hubbard Hardware as a friend. They know that once a job's completed with Hubbard they won't be back to make repairs and replacements. They know that Hubbard Pole Line Hardware will last for years . . . for the "duration," last for years and years.

Right now, these qualities in Hubbard hardware are paying dividends. Telephone men with Hubbard-equipped plants are sitting pretty, confident of the service built into these quality products.

DISTRIBUTED BY

AUTOMATIC ELECTRIC
SALES CORPORATION

1033 WEST VAN BUREN STREET : CHICAGO 7, ILLINOIS

System companies.) The Independent telephone industry is now examining the effect of the long distance rate reductions on the commissions and payments by the Bell System on long distance traffic of Independent connecting companies and it is estimated that the reductions mean a diminution of $300,000 to $400,000 per year for the Independents.

But this reduction appeared to be the most important FCC action for the telephone industry for some time. The Commission announced its 1946 first quarter's schedule of hearings with only five out of 241 hearings in the communications field. All the rest were in broadcasting, FM and television. The only interesting telephone hearing was that on recording devices on Jan. 11 in Washington.

NARUC Convention

Harmony between the Federal and State Commissions featured the 57th annual convention of the National Association of Railroad and Utilities Commissioners during the first week of December at Miami Beach. The regulatory commission members also seemed to have adopted a more conservative and serious-minded attitude about their roles in regard to postwar reconversion of communications, utilities and transportation services.

Federal-State relationships were smoother than for the past several years. The meeting was also closed on a note of state sovereignty with the address of Chairman Hatton Sumners (D. Texas) of the House Judiciary Committee.

Chairman John D. Biggs of the Illinois Commerce Commission was reelected unanimously 1946 Association president and chairman Duane D. Swanson of the Nebraska Commission was chosen first vice president. In the only ballot, Walter R. McDonald, able blind chairman of the Georgia Commission, who headed the NARUC Legislation and Special War Committees, was elected second vice-president.

The main feature from the standpoint of the telephone industry was the address of FCC Commissioner Paul A. Walker, who gave an excellent summation of the telecommunications developments which have been "born" during the war and the promises of vastly improved communications services. Commissioner Walker renewed his proposal of an FCC staff group to aid State Commissions in their communications regulatory problems and stressed the tasks of such nature which lie ahead for both Federal and State agencies. He viewed low rates coming out of wartime technical improvements. (See summary of Commissioner Walker's address on page 48 in this issue).

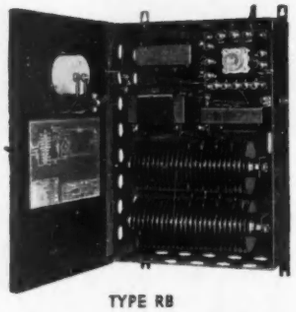
Virginia Commissioner H. Lester Hooker, who heads the NARUC Special Committee on Telephone Regulatory problems, merely submitted a brief statement of the progress of his group and cited that the 150-page report had only been made available to him at the beginning of the convention and could not be distributed at this year's session until fully studied. He indicated it might not be available until some time next year. The staff group of his committee also gave a factual progress report on the study of Bell System license contracts with Virginia commission accountant Brown presenting the statement for E. F. McNaughton, California commission director of Public Utilities, who heads the subcommittee.

Probably the outstanding paper of the entire meeting on broad regulatory subjects was that of Judge John E. Benton, advisory counsel of NARUC, on the "Measure of the Rate Base and Measure of a Fair Return." Citing numerous court decisions and the historic progress of judicial thinking in utilities rate-making, Judge Benton struck home the message that commissions had to engage in fair treatment and that the public interest is not necessarily served by the lowest rate, if the latter would jeopardize the adequacy and efficiency of the service. Utilities, too, must get a rate high enough to attract investment, he added, and the interests of utility owners and the public are common in these respects.

These common interests should guide regulatory commissions to act fairly and intelligently in making rates, he emphasized, regardless of due process and statutes. The commissions, he said, must be governed by their estimate of the probable economic effect of the rates to be prescribed rather than constitutional or statutory limitations. If the commissions follow this course, he continued, of fair facts at fair hearings, the courts will seldom disturb their orders.

Judge Biggs, the NARUC president, who will serve his second term in 1946, sounded a warning against the present drift towards centralization of governmental power in Washington as the keynote of his presidential address. Much of his address dealt with the problem of aviation for the state commissions.

The Legislation Committee report of Chairman McDonald contained a resolution, adopted by the convention, which put the NARUC on record in regard to rural telephone legislation in Congress for state commissions to have jurisdiction over any federal loans for the purchase, sale, construction, operation, or enlargement of any telephone line or system. The consent of the state commission must be obtained first, the resolution stated. The views of the NARUC are to be presented at any Congressional hearings on the legislation.



TYPE RB

ELECTROX

BATTERY CHARGER

Will Keep Your Batteries in Peak Condition At All Times.

- Completely Automatic.
- Floats Across the Battery.
- Noiseless. No A.C. Hum. No Interference.
- Trouble-free. Requires No Routine Adjustment. No Bulbs. No Relays. No Vibrators. No Moving Parts.

Capacities of 1 to 12 amperes, from 24 to 48 volts. Other capacities available to meet individual requirements.

Low in cost! See your jobber, or write direct for full information.

Write for Circular 443

SCHAUER MACHINE COMPANY

2059 READING RD., CINCINNATI 2, OHIO

NEALE MODEL "B"

Spinning is the finest method for suspending aerial cable . . . the only method which completely eliminates ring cutting, bowing and crystallization. Equally efficient on existing cable or new construction. One man can do a perfect spinning job . . . does not require truck, tractor or gang of men.

LASHING WIRE CLAMPS
S&S HAND-LINE BLOCK
S&S PLATFORM CLAMPS
"LITTLE GIANT" SLACK PULLER
.091 SPINNING WIRE

BUCKEYE
TELEPHONE & SUPPLY CO.
COLUMBUS 6, OHIO

GOOD EQUIPMENT IS APPLIED COMMON SENSE

BUCKINGHAM Linemen's Equipment is made by specialists. Finest materials and expert knowledge combine to make them first choice with the man on the pole.

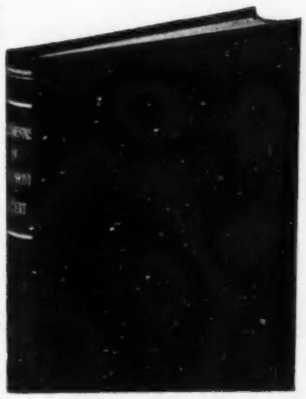
BUCKINGHAM Equipment has proven its worth over a period of 40 years. It is now in general use by the United States Army Signal Corps and leading Utility Companies.

BUILT BY
BUCKINGHAM
OF BINGHAMTON

W. H. BUCKINGHAM MFG. CO., Binghamton 3, N. Y., U. S. A.

Presenting
to Telephone Fundamentals
A Simple, Up-to-the-minute Guide

to give you the groundwork you need for best results in practical work



This first new telephone book in years provides the telephone worker with an understandable treatment of the technical aspects of his work, valuable as a key to better results and improved skill in any job he may undertake. The fundamentals of electricity and acoustics are covered, followed by a full elementary treatment of telephone equipment and circuits, their elements, characteristics, functions, etc.

Just Published

FUNDAMENTALS OF TELEPHONY

By ARTHUR LEMUEL ALBERT
Professor of Communication Engineering,
Oregon State College

374 pages, 5½ x 8½, 200 illustrations, $3.25

This book tells how and why telephone apparatus and lines operate as they do, covers the electrical theory and circuits with which every telephone worker should be familiar. It explains the phenomena of sound as they apply to telephony. It gives a practical knowledge of the functioning of transmitters, receivers, and other elements of telephone sets and systems, including modern manual and dial systems. It shows the requirements of local and toll transmission lines and how they are met, covering electrical measuring instruments, the measurements used in telephony, the problems of interference in telephone circuits, and other topics, in a clear, well-illustrated, elementary treatment, especially arranged for the non-engineering reader.

Check the data in these chapters

1. Direct-current Theory
2. Alternating-current Theory.
3. Electric Networks
4. Sound, Speech, and Hearing
5. Telephone Transmitters
6. Telephone Receivers
7. Telephone Sets
8. Manual Telephone
9. Dial Telephone Systems
10. Transmission over Circuits with Distributed Constants
11. Transmission over Circuits with Lumped Constants
12. Measurements in Telephony.
13. Inductive Interference
14. Telephone Repeaters and Carrier Systems

To Avoid Delay Please Enclose Remittance With Order

Order direct from

TELEPHONE ENGINEER BOOK CORP.
7720 Sheridan Road **Chicago 26, Illinois**

Bell System Needs Higher Earnings to Attract New Capital

THE Bell Telephone System must earn at least from 6½ to 7 percent on its total capital investment in order to attract from investors the large amounts of new capital required, according to Leroy A. Wilson, vice president of the American Telephone and Telegraph Co.

Average earnings on stockholder investments for the period 1920-44 were 7.8 percent, but this figure dropped to 6.7 percent during the war years of 1942-44.

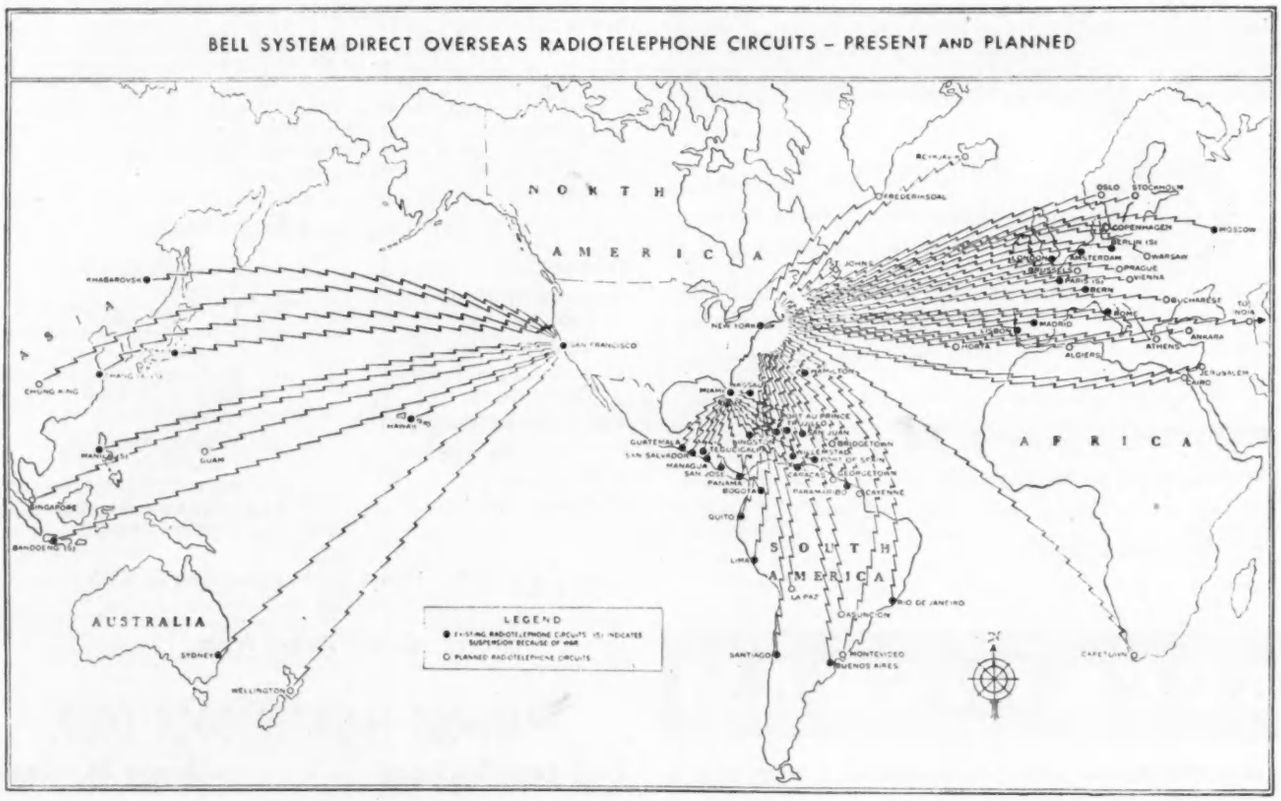
Citing that the System's low earnings in 1942-44 show definitely that it did not profit from the war, in spite of the record volume of business handled, Mr. Wilson stated that today the System must face the fact that it now needs higher earnings in order to compete with other industry to obtain the money for the tremendous construction program which lies ahead to meet the demands and opportunities of peace. Mr. Wilson foresees a possible new capital requirement for more than $2 billion during the next ten years—nearly as much as the Bell System has had to obtain in the last 25 years.

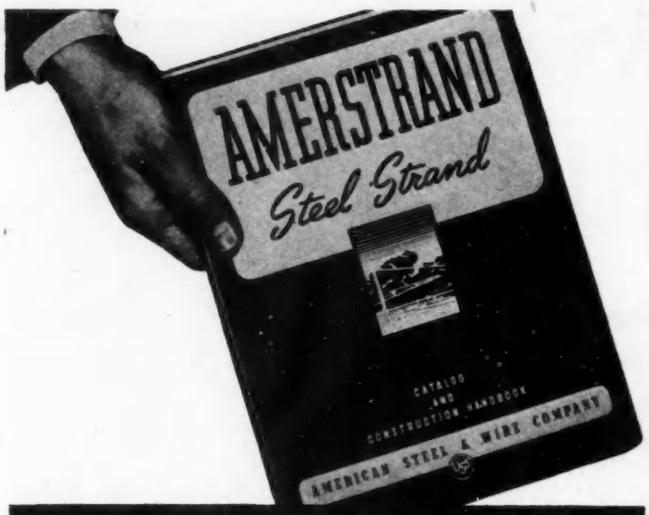
There are many thousands of jobs ahead in the manufacture and installation of plant to provide new and more and better services for the public, Mr. Wilson pointed out. Included in the System's definite plans are such items as taking care of the 2,000,000 presently unfilled orders for telephone service; restoring plant margins to prewar standards; adding another million telephones in rural areas to the million already in service; expanding the program of fast and accurate dial service; adding hundreds of thousands of miles of new long-distance circuits; creating a nationwide network of coaxial cables which will transmit television programs as well as telephone messages; eliminating old telephone instruments and introducing new types; greatly enlarging the scope of radiotelephone service; and providing for the normal future growth of the business.

"Earnings high enough mean that the Bell System can go forward and improve its service, increase employment, pay good wages, develop further ways and means of increasing the value of the service, and in the long run continue to reduce its cost," said Mr. Wilson. "Experience proves it. It is because the Bell System as a whole has obtained enough money to do its job well that it has been able to give its customers much more for their money."

The money invested in the Bell System, Mr. Wilson reported, has increased from about $1¼ billions in 1920 to a total of more than $4 billions at the end of 1944. About two-thirds of these $4 billions have been invested by stockholders, who now number more than 680,000. The remaining one-third is borrowed money. It is upon this entire capital structure, composed of both stocks and bonds, that the need for earnings of at least 6½ to 7 percent is based.

Reviewing the history of Bell System service to this country, Mr. Wilson lists many specific improvements which have been brought about during the last 25 years. The number of telephones has nearly tripled in that period, while population has gained only about 30%. The average daily number of conversations handled by the System went up from 33 million to more than 85 million, and conversations per person increased from about 160 to 280 per year. Mr. Wilson stated that "today telephone service is being furnished at relatively less cost to the user than at any time in telephone history." In addition, he continued, "service is faster, more accurate, more dependable, more courteous as well as many times more extensive. It is also 'more for the money'. Compared with rates of 25 years ago, Bell System customers are now saving 250 million dollars annually."





A Free Book *for You*

Contains complete, authoritative information on Steel Strand, for engineers, construction and maintenance men.

THIS handbook concerns the application of U·S·S Amerstrand Steel Strand as overhead ground or "static" wire, as guy wire and as messenger wire in overhead transmission, distribution and communication lines. It also includes complete data and descriptive material on the various constructions and grades of Amerstrand Steel Strand, which with its companion product, Amertel Telephone and Telegraph Wire, is well and favorably known to many operators of outdoor plants.

The many practical chapters—such as Physical Properties, Standard Lengths, Anchors, Loading Map and Table, Sag and Tension Curves—make this ready reference book a treasure chest of informative, helpful data, an invaluable guide to efficient and economical buying.

Just fill in and mail the convenient coupon and your *free* copy will be forwarded promptly.

American Steel & Wire Company

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

EVERY SUNDAY EVENING, United States Steel presents *The Theatre Guild on the Air*, American Broadcasting Company coast-to-coast network. Consult your newspaper for time and station.

These tags are placed for your protection on every coil of AMERTEL Telephone and Telegraph Wire and AMERSTRAND Steel Strand. They are your assurance of highest quality.

MAIL THIS COUPON TODAY

American Steel & Wire Company
440 Rockefeller Building,
Cleveland 13, Ohio

Please send me a free copy of your Amerstrand Handbook.

Name..... Title.....
Company.....
Address.....
City..... State.....

You can't beat the *Nicopress* method of *making dead-ends*

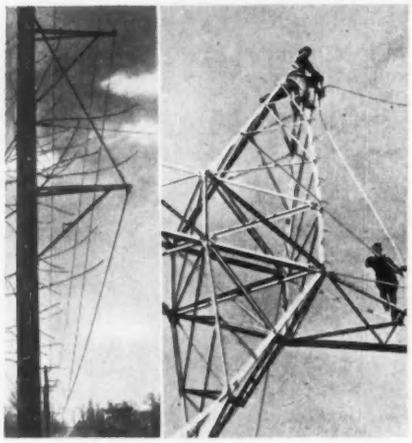
THE NATIONAL TELEPHONE SUPPLY COMPANY

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA
Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

Copperweld Issues 30th Anniversary Booklet



Dramatic pictures of the various jobs Copperweld products are doing fill this 30th anniversary booklet that telephone men will enjoy seeing.

In commemoration of its long and successful record, the Copperweld Steel Company of Glassport, Pa., has just prepared a colorful brochure outlining its history, together with many other interesting features. Outstanding installation photographs showing some of the places where Copperweld products are being used are included in one of the sections.

Mr. S. E. Bramer, president of the Copperweld Steel Company, makes the following comment at the beginning of this book: "We are proud of our past thirty years of accomplishment—but what we have done is not nearly so important as what we will do. We will strive always for higher quality and better service, for the good of all our customers, employees and stockholders."

H. S. Williams Returns To Automatic Electric Sales

H. S. Williams, who prior to entering active service with the United States Navy was vice president of Automatic Electric Sales Corporation in charge of government negotiations, has now been released from the service and has resumed his former position, with headquarters in Chicago. Mr. Williams was a member of the United States Reserve prior to the Pearl Harbor attack, immediately after which time he was called to active duty. At the time of his release from the service he had attained the rank of Commander.

Mr. Williams entered the employ of Automatic Electric organization in 1924. After completing the customary training course, he spent some months in the inspection engineering department

H. S. Williams

of the Automatic Electric factory, and in 1925 joined the sales organization. For several years he was engaged in various industrial sales activities, later becoming assistant sales manager in charge of specialty sales. In 1933, he went to New York to become Eastern manager for the sales company, and in 1935 was elected vice president in charge of government sales. During 1940 and 1941, he was occupied fully with staff work on the fast growing volume of government contracts.

Called to active duty with the Navy in December, 1941, Mr. Williams was first assigned to the New York Navy Yard, where, as lieutenant-commander, he assumed duties as Assistant Planning and Estimating Superintendent for the Industrial Department.

In September, 1942, he went to Washington where he was engaged on special assignments for the Chief of Naval Operations; and beginning in January, 1943, was engaged in important missions which took him to China and other points in the Far East. Returning to the United States in November last year, he was appointed Planning and Estimating Superintendent of the New York Navy Yard, which position he continued to hold until his release from the service and the resumption of his duties with the Automatic Electric Sales organization.

Rural Company Sold

The Blue Earth County Telephone Company, Lake Crystal, Minn., received permission from its state commission November 29 to sell its entire physical telephone properties, leases and franchises to Arthur A. Rudloff, who will operate the property under the name of the Lake Crystal Telephone Company.

P&H PENTA POLES

FULL LENGTH TREATED NORTHERN WHITE CEDAR

They are pleasing in color-neat in appearance

'45 P&H PENTA

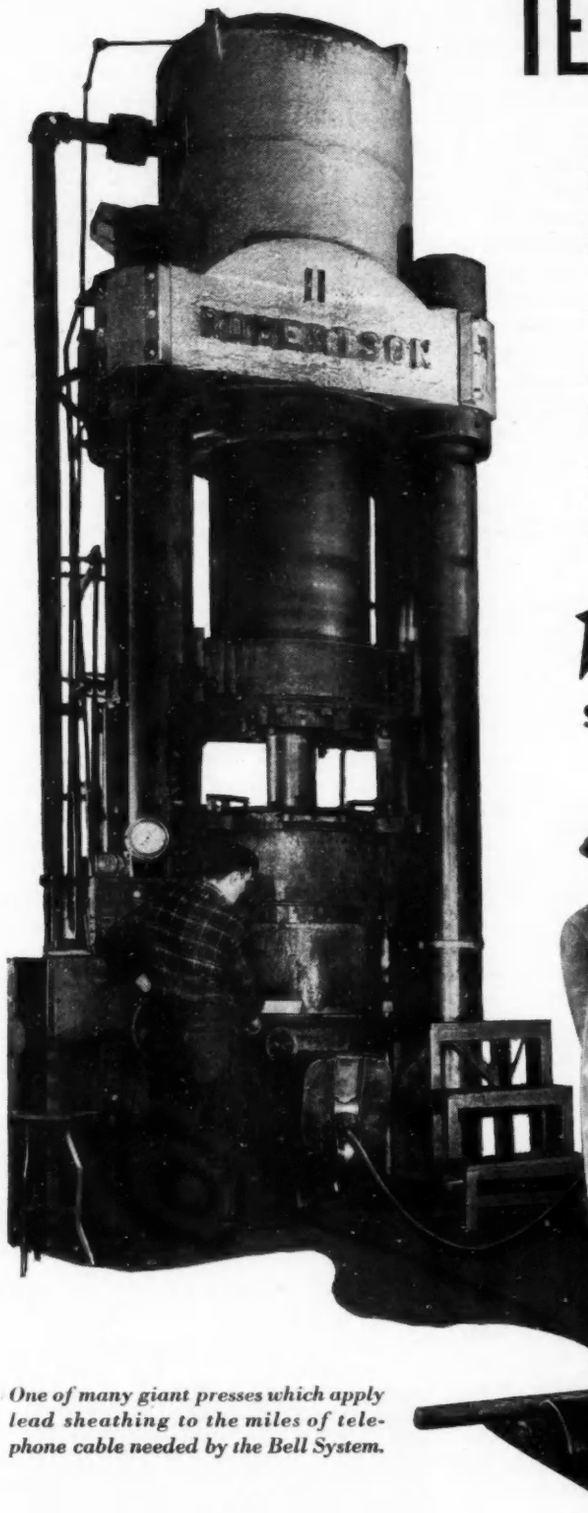
P&H

PAGE AND HILL CO.

MINNEAPOLIS, MINNESOTA • 50 CHURCH STREET, NEW YORK, N. Y. "STILL IN THE LEAD"

Distributed by AUTOMATIC ELECTRIC SALES CORPORATION STROMBERG-CARLSON COMPANY

Full speed ahead on NEW TELEPHONE EQUIPMENT



Since the war ended, thousands upon thousands of new telephones have been produced and installed.

Hundreds of miles of telephone cable have rolled out of Western Electric plants to provide more circuits.

Central office switchboards and other equipment are being manufactured with all possible speed.

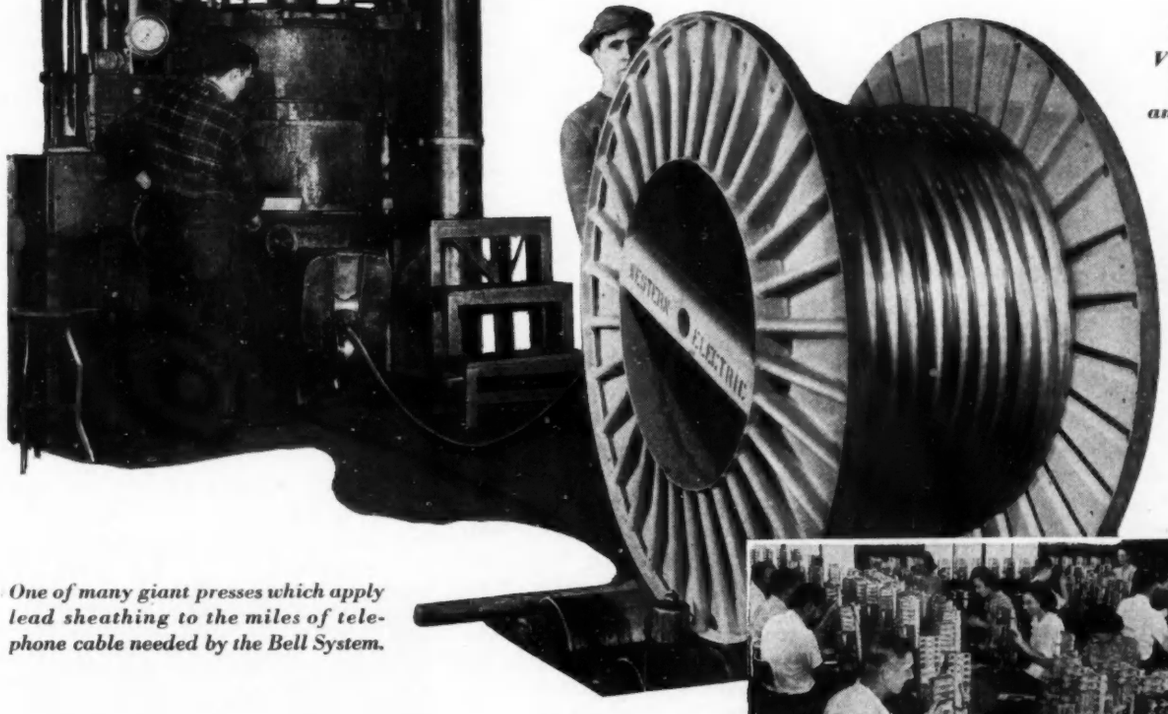
Much of this equipment is extremely complex—not only to *make* but also to *fit into the Bell System network.* Naturally shortages caused by four years of war cannot be made up for overnight.

Supplying materials and equipment for the Bell System's $2,000,000,000 construction program promises record *peacetime* volume and a level of employment at Western Electric higher than in the years immediately preceding the war.

Western Electric

SOURCE OF SUPPLY FOR THE BELL SYSTEM

Buy all the Victory Bonds you can—and keep them!



One of many giant presses which apply lead sheathing to the miles of telephone cable needed by the Bell System.

In our factories, thousands of men and women are building complicated central office equipments with all possible speed.

LINE and DESK

Edited By
J. S. REED, JR.

Q. We have been experiencing difficulty in making drop wire entrances in brick veneer houses built within recent years. We usually bore the entrance hole in the frame of the basement window, but these houses have either windows with metal frames or patent windows with thin wood frames. Should the entrance be made through the brick wall?

A. It is entirely proper to drill through the brick when it is not practicable to make the entrance in any other way. Use a ¾-inch brick drill, drill through an intersection of mortar joints in line with the foundation sill of the building. When the wood sill is reached, clean out the hole and bore through the sill with a ⅝-inch wood bit. To make a neat appearing job, bush the hole with a 5/16-inch porcelain tube from the outside as well as from the inside. (A porcelain tube is required where the wire is to pass through wood.)

In the question entitled "What causes bell tapping at dial or common battery stations?" in the Nov. 15 issue, part of the sentence stating the remedy for bell tapping was omitted through an oversight. This sentence should have read, "The remedy is to reverse the ringer connections and, if this is insufficient, tighten the biasing spring until the bell doesn't tap when the dial or hook lever is operated."

Q. We are planning to install a natural gas heater in our office building. We have a switchboard with its face in the operating room and office and its back in the main frame room. We propose to heat only the front room. Would we have any trouble with moisture condensing on the switchboard equipment if the back room were left unheated?

A. If you use ordinary dry heating, there should be no trouble with moisture condensing on cold objects in the switchboard positions due to warm air flowing through the jacks and other openings in the face. However, if a humidifier were employed to reduce dryness in the operating room, there is danger of moisture collecting on the equipment inside the switchboard position. In that case it would be advisable to heat the back room at least sufficiently to prevent too great a temperature variation between the two rooms.

Q. When testing rural lines from the office with the wire chief's test set, it is sometimes difficult to distinguish between a short and the low resistance produced by the parallel connection of the subscriber's bells. Is there some other way of distinguishing between these two effects?

A. A fairly satisfactory way of distinguishing between a line short and the resistance of the bells in parallel is to ring out on the line and note the brilliancy of the resistance lamp in series with the ringing leads. If the lamp glows brightly, a short-circuit of the line is indicated; whereas only a faint glow or none at all shows the resistance reading to be due to the parallel connection of the bells. This test is based on the fact that the bells offer a higher impedance to the alternating current than to the direct current from the testing battery and in this way permit less current to pass than would be shown by the testing meter.

Q. I have heard of filters being used in rural subscribers' telephones to suppress noise due to induction from power lines. What are the components of a filter of this type and in what part of the circuit is it used?

A. A filter that has been found fairly effective in reducing low frequency noise inductance has the following components: an 0.75 M.F. condenser in the connection between the receiver and the secondary of the inductance coil, and a 60 millihenry inductance across the receiver and 0.75 M.F. condenser combination as shown in Figure 1. Radio type units may be used for making up the filter.

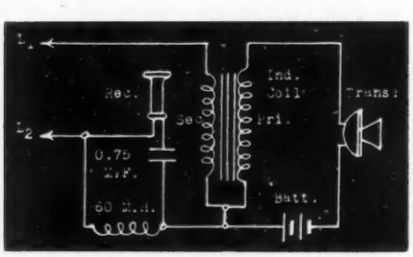


Fig. 1—Showing connections for a filter to reduce noise due to low frequency induction from power lines.

The 1946
TELEPHONE "BLUE BOOK"
and BUYERS' GUIDE

is now being compiled and will be published as a separate section of January 15, 1946 TELEPHONE ENGINEER and MANAGEMENT.

As to "WHO-MAKES-IT" or "WHERE-TO-BUY-IT" the BLUE BOOK & BUYERS' GUIDE serves as an authentic and complete directory of manufacturers and suppliers plus the products they serve to the telephone industry.

1. Manufacturers and Suppliers serving the industry listed three ways under "Products Classified," "Trade Names," and "Complete Names and Correct Addresses."
2. Finger-tip information on all equipment and supplies needed to operate any telephone company, large or small.
3. An editorial storehouse of information for everyone connected with the managing, operating and maintaining of telephone plants.
4. A useful life of 12 months as a "Where to Buy It" Directory for approximately 15,000 buyers of Communications equipment.

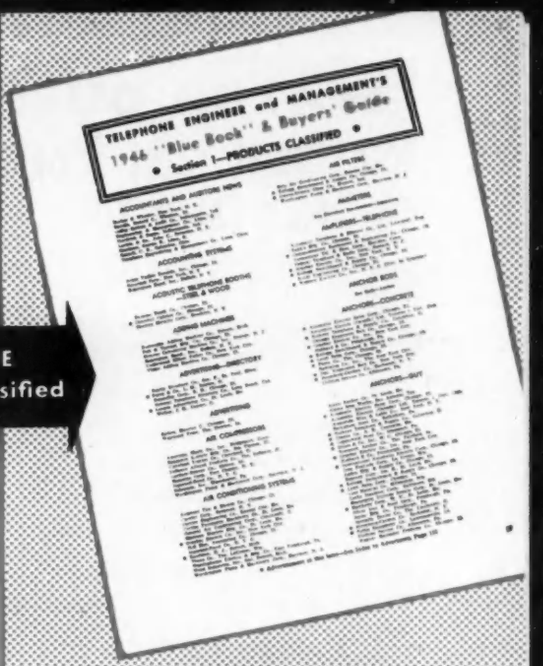
Order Extra Copies of the 1946 "BLUE BOOK" & BUYERS' GUIDE today

All subscribers will receive one copy of the "BLUE BOOK" & BUYERS' GUIDE as usual . . . but with paper still tight we must have orders for additional copies before publication. Extra copies $1.00 each.

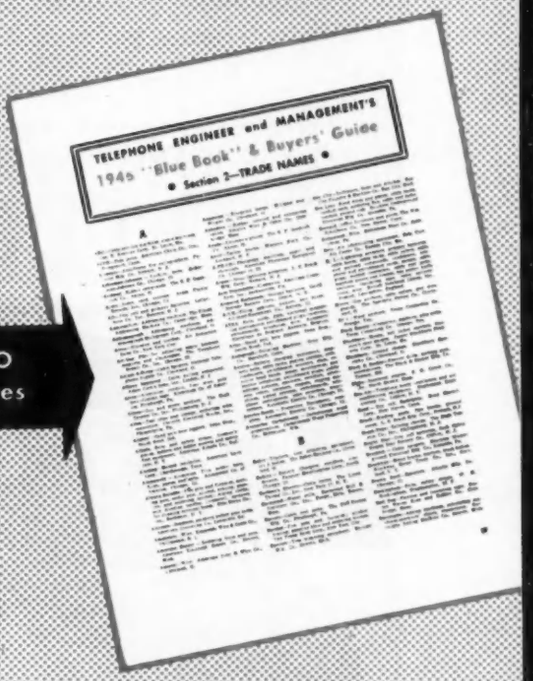
A Valuable Selling Tool for Companies Supplementing their Listings with Advertising . . . . .

Advertising in the Telephone "BLUE BOOK" and BUYERS' GUIDE has long life (twelve months). It is on the job when many specifications are written and buying decisions are made . . . Regular advertising users of this important issue find it more productive than any other medium. Write for additional information.

PART ONE
Products Classified


TELEPHONE ENGINEER and MANAGEMENT'S
1946 "Blue Book" & Buyers' Guide
• Section 1—PRODUCTS CLASSIFIED •

PART TWO
Trade Names


TELEPHONE ENGINEER and MANAGEMENT'S
1946 "Blue Book" & Buyers' Guide
• Section 2—TRADE NAMES •

PART THREE
Manufacturers' Names

TELEPHONE ENGINEER and MANAGEMENT'S
1946 "Blue Book" & Buyers' Guide
• Section 3—MANUFACTURERS' ADDRESSES •

TELEPHONE ENGINEER PUBLISHING CORPORATION

Publishers of TELEPHONE "BLUE BOOK" & BUYERS' GUIDE

7720 Sheridan Road, Chicago 26, Illinois

WATCH OUT!
THAT FIRST SLEET STORM MAY CATCH YOU UNPREPARED

Remember last winter when the first sleet covered the lines . . . connections broken—wires down—service interrupted in many rural sections? Nicopress sleeves were the answer then. They will be the answer again this year. Be sure you are prepared. Order your Nico's today from Suttle. You'll get it quicker the Suttle way.

DEPEND ON SUTTLE

Sowing the Seeds

(Continued from page 29)

the properties. The purpose of the annual report to the employees, however, and the reason for its distribution are best expressed in the following quotation taken from an annual report prepared for the employees of an eastern Independent telephone company: "The company is not specifically the directors, the officers, the department heads, or any other group. These men seldom meet the public. The company, in the mind of the public, is the local employee—the plant man, the operator or the commercial representative, each of whom has daily contact with the public both on and off the job."

The annual report then, is one of the tools which we might use to prepare our workers for their public contacts, but it is only the beginning. Whether it be designed for stockholders or employees, the annual report is principally an historical document although frequently it does contain some estimate of the company's outlook for the succeeding year. What we must give our people, however, if they are to participate in our public relations work, is current information or to repeat, orientation to the existing circumstances.

If we should take the time to consider them, we would realize that there is a public relations value in the multitude of differences between the operation of a telephone system and the conduct of any other type of business. In general, all utilities are thrown into one category in the public mind, yet there are technical aspects of the telephone industry which set us apart definitely and which introduce into our public relations some considerations which do not face the gas or power or water companies. These differences are elementary in our minds and it may appear to be a waste of paper and printer's time to refer to them here, but to what extent have we called them to the attention of our employees or the public? Surely, our employees are aware of these differences but have they recognized them as significant factors which should be pointed out to their friends in the community?

For example, to the person who is unfamiliar with our business or who has not taken the time to wonder about how his messages are transmitted, the furnishing of telephone service is not much different from the furnishing of any other utility service. When he moves into a house or apartment he knows that he merely plugs in the refrigerator, connects up his gas range, and with the flip of a switch and the turning of some valves, his power, gas and water are ready for his immediate use. If he is building a new home, he knows that he only installs the meters, taps the mains or power lines and then proceeds to use the service. To him, the job of establishing telephone service in his home consists of the routine of tapping the wire or cable which passes his property and connecting it to the instrument. Each of us has encountered the general public impression that nothing more than a telephone instrument is needed to furnish service in a home near a wire or cable lead, and that it is only a shortage of instruments that is holding up such service. People who have been waiting for new refrigerators and washing machines already have seen the new models

Toroids..
by
DX
Doughnut Coils for telephone and electronic purposes. High Permeability Cores are hydrogen annealed and heat treated by a special process developed by DX engineers. Send us your "specs" today — ample production facilities for immediate delivery.
DX RADIO PRODUCTS CO.
GENERAL OFFICES 1200 N. CLAREMONT AVE., CHICAGO 22, ILL., U.S.A.
DX
COILS
"the heart of a good receiver"

LENZ DESK STAND CORDS
LOOK FOR
LENZ
THIS MARK OF QUALITY
LOOKING AHEAD
LENZ engineers have always looked ahead for ways and means to improve Telephone Cords, Wire and Cable in order to give you the best product possible.
For instance: The extra tough outer braid of LENZ Desk Stand Cords prolongs their serviceability. The sturdy tinsel conductors maintain highest transmission efficiency. LENZ method of twisting insures uniformity and protection against kinking.
Keep your telephones in service longer—Specify LENZ. Write today for complete information.
DISTRIBUTORS
LEICH SALES CORP.
427 W. Randolph St.
Chicago, Ill.
H. H. VAN LUVEN
307 E. 3rd St.
Los Angeles, Calif.

LENZ ELECTRIC MANUFACTURING COMPANY
1751 N. WESTERN AVE., CHICAGO, ILLINOIS, U. S. A.
"IN BUSINESS SINCE 1904"

Telephone Engineer

HANDBOOK TABLES

Lead Sleeve Dimensions for Various Sizes of Telephone Cable

Index—Cable Splicing Data
Date—December 15, 1945

Note (1)—Use this size of sleeve if the main cable is to be cut for the splicing operation.

Table No. 2 (b) Dimensions of Lead Sleeves for Bridge S plices (22 or 24 ga. Branch Cable Spliced to 22 ga. cable)

Gauge and Pair size of Main Cable	Pair Size of Branch sable (22 or 24 ga.) 15 pr	25 pr.	50 pr.	100 pr.	150 pr.	200 pr.	300 pr.	400 pr.	600 pr.
22 ga., 25 pr.									
Length of Sleeve	15 "	15 "							
Inside Diameter	1¼"	1½"							
22 ga., 50 pr.									
Length of Sleeve	15 "	15 "	17 "						
Inside Diameter	1½"	1½"	1¾"						
22 ga., 100 pr.									
Length of Sleeve	17 "	17 "	17 "	17 "					
Inside Diameter	1¾"	1¾"	2 "	2 "					
22 ga., 150 pr.									
Length of Sleeve	17 "	17 "	17 "	17 "	20 "				
Inside Diameter	2 "	2 "	2¼"	2¼"	2½"				
22 ga., 200 pr.									
Length of Sleeve	17 "	17 "	20 "	20 "	20 "	20 "			
Inside Diameter	2¼"	2¼"	2½"	2½"	2¾"	3 "			
22 ga., 300 pr.									
Length of Sleeve	20 "	20 "	20 "	20 "	20 "	20 "	20 "		
Inside Diameter	2½"	2½"	2¾"	3 "	3 "	3½"	3½"		
	2¾" (1)	2¾" (1)							
22 ga., 400 pr.									
Length of Sleeve	20 "	20 "	20 "	20 "	20 "	20 "	20 "	20 "	
Inside Diameter	2¾"	2¾"	3½"	3½"	3½"	3½"	4 "	4 "	
	3 " (1)	3 " (1)							
22 ga., 600 pr.									
Length of Sleeve	20 "	20 "	20 "	20 "	20 "	20 "	22 "	22 "	22"
Inside Diameter	3 "	3 "	3½"	4 "	4 "	4 "	4½"	4½"	5"
	3½" (1)	3½" (1)							

This powerful ringing converter has proven its efficiency under the severest operating conditions. Has no wearing parts assuring a long, dependable, trouble-free life.

ALSO PULSATORS

SUB-CYCLE

Sold by Leading Distributors

LORAIN PRODUCTS CORPORATION
LORAIN, OHIO

and have entered their orders for them, and they know that when their machines are delivered they need only plug them into the house wiring and enjoy them. They look upon a telephone instrument as relatively simple to manufacture, they think that it can be connected with only little more effort than the refrigerator or washing machine, and they become impatient at delay in obtaining service. Well, this is understandable because we can hardly expect our customers and applicants for our service to be familiar with the intricate system and mechanism which is required to make the instrument workable. Even the man who knows that he shares a party line loses sight of the fact that an extensive individual system of wires, switches, relays and many other items must be provided for each party line and for each individual line, and he fails to realize that telephone messages cannot be transmitted like electric energy or distributed like gas or water.

It is by the use of such elementary facts, however, that we must approach our present public relations problem because our entire case today rests on shortages of materials and equipment and our inability to purchase and install in a short time the plant additions required to serve the waiting millions, and to improve the quality of our existing service. Why not orient our employees to our present situation, then, and let them spread the word? To prepare them to take their place in our public relations work, a place which they are eager to occupy, incidentally, we might call to their attention the foregoing aspects of telephone service, as well as the following, among other items:

(1) The manufacture of central office equipment requires months because it must follow custom processes and precise engineering specifications, and that, therefore, it cannot be compared to the manufacture of any of the machines with which most people are familiar.

(2) Because of the individual characteristics of telephone service, months are required to construct new telephone plant, to test it, and to coordinate it into the existing system.

(3) The volume of toll business has increased tremendously throughout the nation because of calling habits acquired during the war and because of tariff reductions, and switchboards and trunks are inadequate to meet current demands without delays.

(4) Telephone service is a casuality of the war and that, although the reconversion of telephone manufacturing facilities requires relatively little time, the demand all over the country is too great to be satisfied in less than many months.

(5) The telephone company has employed all sorts of expedients to stretch its facilities as far as possible and to provide service for the maximum number of families and now further stretching is out of the question.

Each of the foregoing items might be elaborated and further facts and statistics might be used to lend emphasis to them but it is unnecessary to discuss them at greater length here because each of us is familiar with them and their consequences. They are set forth here merely to illustrate the type of information which we need to publicize at this time. The question, however, is whether the people of our organization are familiar with them and whether they are using such information in their on-and-off contacts with the public.

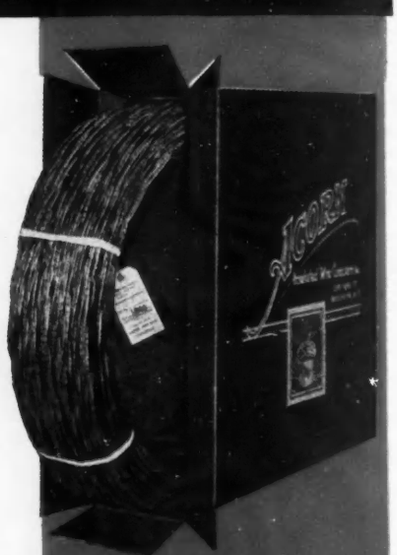
Information on the nature of the foregoing is only explanatory of the present situation and to accomplish what we are shooting at in terms of public understanding and forbearance, it should be accompanied by some statement of what we are doing to improve the present situation. There is scarcely a telephone company in the country which does not face an all-time high in construction and maintenance work—projects designed to provide more service or to improve existing service. The sick man is not satisfied with a diagnosis of his ailment; he wants to know what measures the

ACORN INSULATED WIRE

TODAY TELEPHONE WIRE has to be tough

Many years of specialization in the manufacture of communication wire has built a performance record for Acorn Drop Wire.

ACORN INSULATED WIRE COMPANY, INC.
225 King Street, Brooklyn, N. Y.
LEICH SALES CORP., 427 W. Randolph St., Chicago
LINDSAY SUPPLY CO., 4815 Superior Ave., Cleveland



PREVENT ACCIDENTS! ACORN'S exclusive Carton Packaging for Safety and Better Warehousing.

Drop Wire—Bridle—Interior—Tree—Ground—Switchboard—Pothead—Cable Terminal—Instrument—Fixture—Buried Wire

doctor is employing to cure him. Similarly, we accomplish nothing when we tell applicants for service that there is a shortage of telephone equipment of all classes, or when we tell our customers that service improvements await additional switchboard positions or more trunks. Those people want to know what we and our engineers are doing about it and when the situation will be relieved.

Today we are all busy every moment of the day working on the projects which must be completed before the situation can be improved. To take the time to prepare and disseminate the type of information referred to above only looks like delay of the more important work. The time we lose answering customers' complaints and questions and appeals for special treatment might be lessened, however, if we should spend a few moments preparing information which our employees might use to answer these questions before they reach the desk of the president or the general manager of the company. And today there are but few company officials who are not receiving these appeals personally in their offices and in their homes. A public which has become accustomed to fixing traffic tickets and securing other favors and immunities through influence is confident that it can secure special consideration in all things by appealing to somebody "higher up." Hence, the information which is given to these people by our employees should be so conclusive and positive that the temptation to go higher will be frustrated.

The medicine which should be distributed to our employees for dispensation to the people who complain about lack of service or who criticize poor service comprises information concerning the measures we are taking to remove those complaints and criticisms. For example, we should publicize the location, type and extent of the plant additions for which materials have been ordered. If we have contracted for a quantity of additional central office equipment, we can make such information interesting by translating it into terms of additional services which will be available when that equipment is installed. If we have purchased another construction truck, the significance of the investment may be expressed in terms of additional pole lines and wire plant which that truck and its gang can contribute. Additions to operator positions at switchboards mean improved service for existing customers or ability to serve more families. These items are subject to elaboration, but it is my purpose here only to suggest ideas and to outline an approach, not to attempt a text.

The theme of any text that might be attempted, however, is that almost all telephone companies face a critical public relations condition which is very likely to grow worse before it begins to show improvement. The conventional forms of advertising and of presenting our case publicly offer substantial relief to us but they do possess inherent limitations. Newspaper space and bill inserts generally receive scant attention when they contain the type of information we are considering here because they cannot carry the entire story and the partial story only contributes further to the growing public impatience. Also the statements which people read in these media have only the effect of a shot in the arm; it is not of lasting duration. It was only by constant repetition through all forms of publicity that any degree of success was attained in the program to induce users to limit the length of their calls during the war. Probably any manager will corroborate the testimony that efforts to divert traffic to less busy hours by use of advertisements and bill inserts are successful for a very short time unless the efforts are unceasing. A word-of-mouth campaign, based on facts and revised to keep abreast of the progress we make, however, offers more advantage in terms of lasting effect.

It has long been a favorite sport to badger the telephone man or the representative of the utility company at service club meetings and at social gatherings. The telephone man who is in possession of the facts about his company can meet these sallies in the spirit in which they are directed, and with confidence. If his brother Lions are merely making him the butt of the day's horseplay he can parry their thrusts in the same vein. When the conversation inclines toward more serious ends, he is prepared with current facts and information. What is the position, however, of the telephone man who has not been provided with information of his company's problems, plans and progress? When his brother Knights or Eagles begin to pan him, shall we let him squirm and grope for excuses?

From president to messenger boy, each of us wants to think that he works for the best company in the country and to be able to uphold that company in any debate. The worker does not want to be embarrassed and unable to reply when he hears his company charged with poor practices or failure to perform its duty to the public; and he does not want to be forced to resort to lame excuses or generalities. He wants to be able to speak with confidence about his company and its leaders. Knowledge and information will give him that confidence and will make him the public relations agent that he wants to be and should be.

HEMINGRAY INSULATORS

Favorably Known Since 1870

HEMINGRAY No. 42
Standard for many years. Its long leakage path keeps toll lines trouble-free.

ALL FIRSTS—NO SECONDS!

Hemingray Insulators are checked and rechecked—all along the production line.

Checked carefully by visual inspection — checked thoroughly under exacting laboratory control!

That's why Hemingrays are so uniform, so dependable. That's why Hemingrays cost so little in actual service life.

Hemingrays are sold by principal jobbers and are manufactured by Owens-Illinois, Hemingray Division, Muncie, Indiana.

OWENS-ILLINOIS
HEMINGRAY INSULATORS
Telephone-Telegraph
Export Agents: International Standard Electric Corporation, New York City

Editorial Index — VOLUME XLIX

TELEPHONE ENGINEER & MANAGEMENT

January-December 1945

Advertisers' Index (see Index)

Authors: Angle, W. M., 3-26; Blakeslee, E. M., 2-24; Burden, B. C., (see Radio) 11-26, 12-30; Corbett, W. A., 4-36; Davies, R. C., 8-37, 9-62, 12-48; (see Highlights); Fisher, B. L., 6-24; Grimm, G., 5-56; Herrman, W. J., 8-26; Holmwood, H. W., 12-27; Peebles, L. H., 9-62; Peltz, H. F., 4-36; Peterson, G. W., 7-25; Porter, J. R., 5-27; Reed, J. S. Jr., 3-29; 4-60; 9-46; (see also Line & Desk, Handbook Tables, FORTNIGHTLY index); Sage, K. B., 7-48; Smith, Ray W., 2-30; Sorber, G., 5-68; Stacey, G. W., 8-34; Walters, E. J., 11-34.

Amended U-2 Order (Complete text) 5-25; 10-33

An All Purpose Truck, by K. B. Sage, 7-48

Automatic Equipment: Bloomington Exchange—Pattern for Tomorrow, 5-68; Guam Has Automatic Telephone System, 8-62

Auxiliary Signals and Devices for Added Income, by J. S. Reed, Jr., 9-46

Bell Radar Accomplishments, 10-74

Bell System: Annual Report, 3-58; Expansion Program, 8-60; Needs Higher Earnings, 12-66

BLUE BOOK & Buyers' Guide: Manufacturers' Addresses, 1-92; Products Classified, 1-57; Trade Names, 1-97

Buying (See BLUE BOOK)

Cable Work, Use of Nitrogen gas, 11-26

Cartoons: 5-29; 6-33, 66; 8-29; 10-31, 38, 43, 80; 11-33

China, and India Linked by Telephone, 7-42

Chinese Telephone Confusing Gadget, by George Grim, 5-56

Classified Ads: 1-148; 2-68; 3-76; 4-108; 5-80; 6-68; 7-76; 8-76; 9-96; 10-88; 11-72; 12-80

Climbing, 4-36; 10-52

Coaxial Telephone Channels, 9-37

Coming Age of Conversation, by C. F. Mason, 1-42

Communications & Electronic Developments: 1-124; 3-37; 4-45; 5-62; 6-53; 7-44; (Also see FORTNIGHTLY Index)

Concrete Telephone Poles, 10-70

Conduit Type Baseboards, 9-36

Conference on Rural Problems in Illinois, 8-64

Construction, 4-34; 4-46; 4-74; 8-34; 9-36; (Also see Line & Desk, TELEPHONE ENGINEER Handbook Tables)

Convention Dates, 1-50; 10-30; 11-30; 12-35

Conventions (See National and State Assoc. News)

Courses: Radio Course for Telephone Men (See TELEPHONE ENGINEER'S; also in FORTNIGHTLY)

Current Inter-Company Settlement Problems, by Walter J. Herrman, 8-26

Dakin is President, Gen. Tel.'s Central Group, 5-54

Do You Know—Fact & Fancy in the Telephone Industry; 5-30; 6-56; 7-60; 10-34; (Also see FORTNIGHTLY Index)

Durham Tel. Co. Installs Army Hospital Service, 6-50

Editorials: The Hill Rural Telephone Administration Bill, 1-39; Rural Telephone Legislation, 2-21; A Vital Part of the Independent Telephone Business, 3-24; The Coming Era of Construction, 4-8; Maybe This is It! 5-23; Green Light Ahead, 6-21; In Time of War, 7-24; Democracy at Work, 8-24; The Telephone Company's Reconversion Job, 9-33; Is It Going to Be Inflation?, 10-29; The Pattern for the Future, 11-22; Year-End Balance Sheet, 12-25

Editor's Column: 1-9; 2-8; 3-9; 4-8; 5-8; 6-7

Editorial Supplement to Radio Course, Spectrum Chart inserted in May issue

Electronic Developments (See Communications)

Employee: Deferments, 3-64; Orientation, 6-42; Training for Public Relations, 12-27

Fact & Fancy in the Telephone Industry (see Do You Know)

Foreign Styles in Climbers, 10-52

Government (see WPB; Amended U-2; Editor's Column 5-9; Editorials; Highlights, News Briefs) Bills, 5-52; Commissions, 5-73; Editor's column, 5-9; OPA, 5-76; U-8, U-5, 5-7; Walker Outlines Need for Regulatory Cooperation, 12-48

Guam Has Automatic Telephone System, 8-62

Handbook Tables (See TELEPHONE ENGINEER)

Harrison, William H. (Maj.) Honored, 9-79

Helpful Kinks for Plant Men, 4-34

Henry (Col.) Completes War Duties, 8-66

Highlights of the Communications News, by Roland C. Davies: 1-49; 2-33; 3-35; 4-57; 5-38; 6-34; 7-36; 8-48; 9-54; 10-30; 11-23; 12-44

History—Independent Company, 6-24

Hospital Service, 6-50

How the Lae to Finschafen Pole Line Came into Being, 9-34

Humor (See Do You Know, Cartoons)

Income, Increase, 9-46; 10-66

Increased Rates (See News Briefs) 5-67; 5-53 (toll granted); 8-26 (toll revenues)

Independent Pioneers Hold Directors Meeting, 10-50

Index to Advertisers: 1-150; 2-70; 3-78; 4-110; 5-82; 6-70; 7-78; 8-78; 9-98; 10-90; 11-74; 12-82

India and China Linked by Telephone, 7-28

Ingles, Harry C. Wire Span Across the Rhine, 8-58

Interchange Toll Traffic Considerations, by Edwin M. Blakeslee, 2-24

It Seems To Us, 7-9; 8-7; 9-10; 10-10; 11-8; 12-10

Kinks for plant men, 4-34

Letters from Readers: 1-34; 6-39; 7-47; 10-59; 11-43

Line & Desk—Edited by J. S. Reed, Jr.: 1-130; 2-40; 3-46; 4-82; 5-46; 6-40; 7-38; 8-44; 9-76; 10-62; 11-48; 12-70

Maintenance: (Also see Line & Desk, TELEPHONE ENGINEER Handbook Tables); 4-34; 4-46; 4-74; 3-29; 4-60; 7-25; 8-34; 9-42; 9-66; 11-26; 11-34

Maintenance of the Central Office Battery, by J. S. Reed, 3-29; 4-60

Management Articles: 2-24; 5-27

Management of the Operating Telephone Company, by J. R. Porter, 5-27

Minnesota Convention Report, by Ray W. Smith, 2-30

Moving—The Hard Way, 10-44

National & State Assoc. News: Alabama Conv. Pictures, 12-29; Georgia, 12-34; Maine, 11-30; Michigan, 11-29; Minnesota, 2-30; Nebraska, 7-35; New York, 7-35; South Car., 12-34; Texas, 4-95; 11-30; Virginia, 11-31; Wisconsin, 1-120

New Exchanges (See News Briefs) 5-75, 5-58

News Briefs (Also see FORTNIGHTLY Index): 2-32; 3-34; 4-33; 5-31; 6-27; 7-34; 8-25; 9-45; 10-35; 11-25; 12-26

Noise and Crosstalk due to Longitudinal Unbalances, by Edward J. Walters, 11-34

Notes on Postwar Plant Problems, 9-66

Now is the Time to, 9-58

Observation Tower (The), by the Observer and his Gang: 1-114; 2-28; 3-32; 4-50; 5-32; 6-32; 7-32; 8-28; 9-40; 10-42; 11-32; 12-36

Order U-2 Preference Sequence, 10-33

Orientation of New Employees, 6-42

Pattern of Tomorrow (A)—The Bloomington Automatic Exchange, by G. Sorber, 5-68

Personalities in the News: 1-128; 2-38; 3-48; 4-41; 5-48; 6-46; 7-42; 8-33 9-60; 10-39; 11-54; 12-40

Personnel: (see Employee) Telephone Co. Army Units, 8-37; Training for Public Relations, 12-27

Pioneers, meeting, 10-50

Planning Construction Projects, 4-74

Plan of Radio Relay Stations for Long Distance Telephone, 5-50

Poles, concrete, 10-70

Products of telephone manufacturers (See BLUE BOOK)—January issue

Radar, Bell, 10-74

Radio: Course (See TELEPHONE ENGINEER'S); relay stations, 5-50; Radio telephone, Bell plan, 7-52; Channel Applications, 10-36

Restore and Improve the War Worn Plant, 9-42

Rural Line Noise Problem, by George W. Peterson, 7-25

Simplified Wiring Diagrams, 9-37

Sowing the Seeds, by H. W. Holmwood, 12-27

Spring Construction Planning, 4-46

Story of an Independent Telephone Company—and a Man, by B. L. Fisher, 6-24

Story of WPB Communications Division told by Leighton H. Peebles, 9-62

Subscribers' Transfer Service, 10-66

Teach Men the Art of Climbing, by W. A. Corbett and H. F. Peltz, 4-36

Technical Developments in the Telephone Field, by B. C. Burden (see FORTNIGHTLY index), 12-30

Telephone Advertising Institute, 5-57

Telephone Commission Industry Members Charge Wage Exemption Abrogated, 9-82

Telephone Company Sponsored Army Units Receive Recognition, by Roland C. Davies, 8-37

Telephone in China is Confusing Gadget, by George Grim, 5-56

TELEPHONE ENGINEER Handbook Tables: 1-48; 2-64; 3-66; 4-84; 5-72; 6-64; 7-66; 8-70; 9-90; 10-78; 11-62; 12-73

TELEPHONE ENGINEER's Radio Course for Telephone Men, by B. C. Burden (Also see FORTNIGHTLY Index): 4-42; 5-34; 6-28; 7-30; 8-30; 9-38; 10-45; 11-40; 12-56

Telephone Service to Mobile Units, 7-52

Telephone Tree, 2-56

Television, 5-76

Truck, All Purpose, 7-48

25 Years Ago in TELEPHONE ENGINEER: 1-123; 2-14; 3-18; 4-24

Underground Conduit Construction, by George W. Stacey, 8-34

U. S. Government Orders (see Government)

Use of Nitrogen Gas in Cable Work, by B. C. Burden, 11-26

USITA Activities: Adv. Committee Discusses Tel. Adv. Instit., 5-57; Enlarges Rural Telephone Leg. Committee, 5-53; Board of Directors Meeting; William C. Henry to Lead Independents, 10-40; Plant Report, Section on Radio Channel Applications, 10-36; USITA Committees 1945-6, 11-36; Christmas Message from USITA's President, 12-35

Wabash Tel. Co.'s Equipment, 5-68

We, the Independent Manufacturers, by Wesley M. Angle, 3-26

Wiring, 9-37 (Also see Maintenance)

Wisconsin Convention Report, 1-120

WPB: (see Government, News Briefs); Letter on Employee Deferments, 3-64; WPB Committee, 5-52

Patterson Succeeds Edmondson

On January 1, 1946, A. L. Edmondson, division commercial superintendent of the Southwestern Bell Telephone Company Houston, Texas, retires under the company's retirement plan. His successor will be J. B. Patterson, of Fort Worth, Texas, who has been in charge of commercial activities of the company for Northwest Texas for the last 12 years. Until Mr. Edmondson retires, Mr. Patterson will serve as assistant superintendent.

Mr. Edmondson has been in the telephone service for 45 years, starting his career as a groundman. He helped build pioneer toll lines throughout Texas and Arkansas working as lineman, cableman and construction foreman.

Mr. Patterson has been in telephone service for 27 years, working as trouble shooter, manager, district manager, directory supervisor and connecting company agent before being appointed division superintendent at Forth Worth.

Rate Increase Application

The Womer-Inavale (Nebr.) Telephone Company, filed on November 23, 1945, application with the Nebraska State Railway Commission for authority to increase rates for telephone service from 75c to $1.00 per month.

MAKING DIRECTORY ADVERTISING PAY . . .

Twenty-one years' experience and the sale and management of more than 26 million dollars worth of advertising have given LOOMIS the "KNOW-HOW" to produce greater revenue from Directory Advertising.

We invite you to get the LOOMIS story before your advertising contract comes up for renewal. Address Roland T. Beard, V. Pres., 502 Gettle Bldg., Ft. Wayne, Indiana, or Wesley H. Loomis Jr., Pres., 20 W. 9th Street Bldg., Kansas City 6, Missouri.

Loomis ADVERTISING COMPANY

502 Gettle Bldg., Ft. Wayne 2, Ind.

506 Olive St., St. Louis 1, Mo. 20 West 9th St. Bldg., Kansas City 6, Mo.
6909 Market St., Upper Darby (Phila.) Pa., Omaha Nat'l Bank Bldg., Omaha 2, Neb.

New IMPROVED CHANCE TIPS TUGGER

Pulls or Lifts in any Position...

Chance Tips Tuggers — used for tightening guy wires, hoisting transformers, or any number of pulling, lifting and lowering jobs — have been redesigned and incorporate many improvements over previous models.

- Extreme light weight — easy handling on poles.
- "Herc-Alloy" link chain — no kinking or binding.
- Oil impregnated bushings — no more lubrication.
- Lift wheel and ratchet of heat-treated carbon steel.
- "Finger-reach" up-and-down trigger—one hand operation.
- Tension control — more accurate load spotting.
- "Free Wheeling" —quick adjustment.

Write us, or ask your jobber for more information on Chance Tips Tuggers.

A·B·CHANCE CO. CENTRALIA MISSOURI

Increased Rates Granted

The Patricksburg (Indiana) Telephone exchange recently received authority from its state commission to increase rates. The commission's order gave the company the right to increase the switching rate on subscriber maintained lines from 40c to 75c per month and to establish a $1.25 monthly rate on rural lines maintained by the company. The rate on party lines in the town of Patricksburg was increased from 50c to $1.00 per month with the company performing the maintenance. Private line rates were increased from $1.00 to $1.50 per month.

FCC Acts on A.T.&T. Service to Philippines, Rome, Germany

FCC Nov. 28 granted modification and extension of A.T.&T.'s temporary authority to communicate with the Philippine Long Distance Telephone Co. and also extended the company's special temporary authority to communicate with Italcable, Rome, Italy. A.T.&T. was also granted authority to remove service restrictions and reduce rates on overseas telephone service to Germany and discontinue the rates heretofore applicable to overseas channels for program transmission between New York and Berlin and to establish rates for overseas channels for program transmission between New York and Frankfurt.

New Chief Engineer for A. B. Chance Company

Leonard J. Linde, formerly with General Electric Corporation, Philadelphia, joined the A. B. Chance Company, Centralia, Missouri, a month ago as chief engineer.

Leonard J. Linde

While with General Electric, Mr. Linde did development work on switch gear, receiving jointly with W. J. Lacklan, in 1935, the Charles A. Coffin award and citation for outstanding achievement in the development and design of a secondary network protector. In 1940 he received another joint award with E. W. Boehne for outstanding work in the development and design of the Magneblast Oilless Circuit Breaker. Mr. Linde holds about twenty patents on switch gear equipment.

R. P. Singlehurst Resigns from Telephone Services Inc.

Robert P. Singlehurst, assistant vice president of Telephone Services Inc., Fort Wayne, operating service center for the domestic telephone companies of the Gary Group, has resigned his position with that organization effective December 1, 1945, to return to Honolulu, Hawaii, as a partner in the firm of Angus Danford and Company. This is a new business formed to handle various lines of merchandise in the Hawaiian Islands, the Philippines and the Far East.

Mr. Singlehurst, a native of Hawaii, was formerly associated with the Mutual Telephone Company, Honolulu, in various staff capacities. Coming to the United States in 1942, he was employed by the Union Telephone Company, Owosso, Michigan, a Gary Group company, as assistant general manager. In March of this year he assumed a staff position with Telephone Services Inc., and was shortly thereafter promoted to assistant vice president.

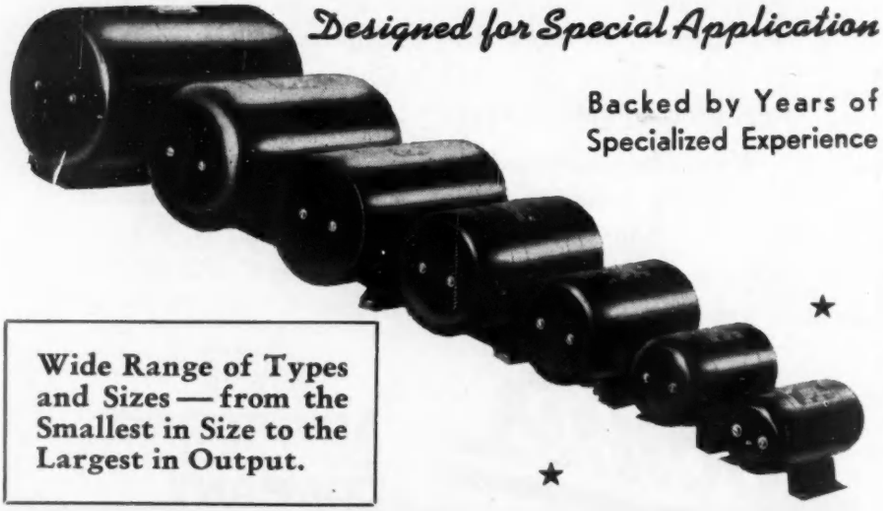
EICOR

DYNAMOTORS, INVERTERS

and other Rotary Electrical Equipment

Designed for Special Application

Backed by Years of Specialized Experience



Wide Range of Types and Sizes — from the Smallest in Size to the Largest in Output.

EICOR INC. 1501 W. Congress St., Chicago, U.S.A.

DYNAMOTORS • D. C. MOTORS • POWER PLANTS • CONVERTERS

Export: Ad Auriema, 89 Broad St., New York, U. S. A. Cable: Auriema, New York

Minority Report Filed on Gwynne Bill; Reported Out by House Rules Committee

A minority report was filed November 19 by Rep. Feighan (D., Ohio) on the Gwynne bill to limit actions brought for violation of federal statutes to one year, where no other statute of limitations has been provided specifically.

The bill was favorably reported by a majority of the members of the House Judiciary Committee and reported out by the House Rules Committee Nov. 2.

The bill would apply to actions arising from the claims based on alleged violations of the Fair Labor Standards Act and would also require that action based on accrued back claims be commenced within six months and would, further, outlaw suits based on alleged violations arising from activities of employers exercised in good faith under reasonable interpretation of compliance with the federal statute.

Despite the minority report, the House may well pass the bill in view of the Rules committee recommendation and limitation of debate. Action in the Senate on the companion Buller bill is not expected until the House acts on the Gwynne bill.

Meanwhile, action on the House and Senate minimum wage bill was pushed further into the future. Chairman Edith Norton of the House Labor Committee is still ill and is expected to be out until Christmas which precludes any possibility of the House bills being considered this session. On the Senate side, the Senate Education and Labor Committee is still awaiting the return of some of its members. One Senator, who is opposed to the bill, has said that he intends to ask for further hearings on the Pepper bill since he has several more parties that wish to be heard.

The minority views signed by Rep. Feighan and Rep. Lane (D., Mass.) stated that the enactment of the bill would seriously impair enforcement of many important laws which safeguard the public interest, including the antitrust laws, the copyright laws, the Fair Labor Standards Act, and the Civil Rights Act. It characterized the one-year period of limitation as "unduly short" and referred to Department of Labor testimony that the one year period "operates in favor of the unscrupulous employer who seeks to violate the law and against the conscientious employer who seeks to live up to the requirements of the law." Wage-Hour Administrator Walling favors a three-year limitation.

The two Congressmen pointed out that minimum wage bills pending before the House Labor Committee include proposals for a five-year period of limitation and suggest that it would be more appropriate to consider the question for that act in those amendments than to legislate in the "blunderbuss manner" proposed in the Gwynne bill. Rep. Kefauver, (D., Tenn.) issued a separate minority statement in which he stated that the period should be longer than one year.

R. A. Hall Joins Staff of Telephone Services Inc.

Announcement has been made by V. E. Chaney, president of Telephone Services Inc., operating service center for the domestic telephone companies of the Gary Group, that Raymond A. Hall has joined the staff of that company as assistant to O. R. Roach, engineer.

A graduate of the University of Montana, Mr. Hall was employed by Western Electric Company from 1925 to 1938 in the engineering of central office equipment. In 1939, he joined the engineering department of Automatic Electric Company, remaining with that company until 1942, when he became associated with the First Service Command of the War Department in Boston, Mass., as telephone engineer. He resigned that position in October of this year to take up his new duties with Telephone Services Inc.

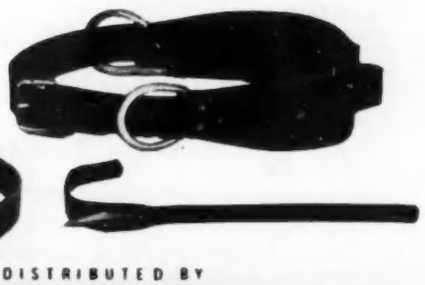
Built-in clamp on Bee Nut and Terminal Post lock wire-to-wire; vibration-proof, low resistance connection. Write for SAMPLES and data.

TEST-O-LITE
Tests Everything Electrical
from 100 to 550 Volts
Equipped with Neon light which tells instantly where trouble lies in circuits, fuses, cut-outs, motors, etc. Indicates hot or grounded wires. Tells AC from DC. SAVES PRECIOUS TIME. The only pocket-size tester with PATENTED SAFETY FEATURE.
Lifetime guarantee. List $1.50. Purchase thru regular electrical dealers. Pat. No. 1,778,883.
L. S. BRACH Mfg. Corp.
55-63 Dickerson St. Newark, N. J.

Play Safe!

Working aloft in all kinds of weather, the telephone lineman deserves the safest equipment that money can buy. Give him confidence in his own safety, by providing him with belts, straps and climbers made by KLEIN—producers of fine linemen's tools since 1857. Telephone men everywhere recognize this name as a synonym for complete reliability—so, for safety's sake, always

Specify KLEIN



DISTRIBUTED BY

AUTOMATIC ELECTRIC
SALES CORPORATION
1033 WEST VAN BUREN STREET, CHICAGO 7, ILLINOIS

The Clearing House

For the Convenience of readers of Telephone Engineer

Telephone Repair & Supply Co.

Repair services for Transmitters, Receivers, Desk Stands and Wall Phones—Magneto or Common Battery.

Specialists in Repairing and Rebuilding Transmitters

WE TRADE
WE REBUILD
WE BUY

Old telephones or parts into smart modern-looking wall phones or desk sets with new cabinets.

Telephone Repair & Supply Co.

Daniel L. McNulty, Manager
Rogers Park Station Chicago

Telephone Engineers

MANFRED K. TOEPPEN
ENGINEER
Consultation - Investigation - Reports
261 Broadway, New York 7, N. Y.

J. G. WRAY & CO.
Telephone Engineers
Specialists in Appraisals, Rate Surveys Financial Investigations, Organization and Operation of Telephone Companies
Suite 2054 231 So. La Salle St. CHICAGO

JAY G. MITCHELL
Consulting Engineer
Operating and Management Economics
Plant—Equipment—Revenue
P. O. Box 43
EATONTOWN, NEW JERSEY

Classified Ads

WANTED: Man thoroughly experienced in magneto telephone work. Permanent employment. Write, Community Telephone Company of Wisconsin, Black River Falls, Wisconsin.

WANTED: Telephone men for Chicago factory. Steady work, good wages and working conditions. Te rebuild telephones, magneto switchboards. Telephone Repair & Supply Co., 1760 Lunt Ave., Chicago, Tel. ROGers Pk. 3818.

CABLEMAN WANTED: Three experienced cablemen wanted by Class A company in Central Florida. Must have at least three or four years experience and be able to handle all phases of cable work. Will pay $46.00 per week on 44 hour basis. All expenses paid while away from headquarters. Group life and sickness disability insurance for employee and hospitalization insurance for employee and dependents provided without cost. If interested, furnish age, experience, references, etc. Write Florida Telephone Corporation, Leesburg, Florida.

WANTED: Combination plant man able to maintain both inside and outside plant of either common battery or magneto exchange of midwestern Class A Telephone Company. Opportunity for permanent employment and good wages. Give age, experience, etc. Write Box 8412, c/o TELEPHONE ENGINEER.

finishing cloths

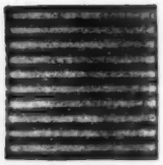
packed in cartons

CABLE-SPLICERS WIPING CLOTHS

Wipe Perfect Joints

on lead-sheathed cable splices

catch cloths



sealed in wax paper wrappers

GEO. E. WILLIAMS, *Mfr.*

3035 Aldrich Avenue So. Minneapolis 8, Minn.

Poles

Cedar Poles
MAC GILLIS & GIBBS COMPANY
Wells Bldg., Milwaukee 2, Wis.
★ ★
Northern White and Western Red Cedar Poles—Plain or Butt-Treated

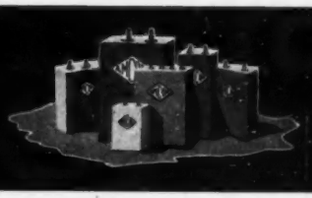
WANTED: Assistant to General Manager for large telephone property. Must have executive ability and administrative experience. In application furnish information as to age, education, experience, present employment, draft status, small photograph, recommendations, etc. Write Box 8386, c/o TELEPHONE ENGINEER.

WANTED: Plant Superintendent for large telephone property. Good salary for man having qualifications. In replying, furnish complete information as to age, education, experience, present employment, draft status, small photograph, recommendations, etc. Write Telephone Services, Inc., 16th Floor, Lincoln Tower, Fort Wayne 2, Ind.

WANTED: CABLEMAN for a Class A Telephone Company in Ohio. We want a man who is experienced in handling all phases of cable work. He must be thoroughly reliable and have initiative necessary to handle work without supervision. If you feel you are qualified, write us giving full details as to your experience, education, age, availability, etc. Write Box 8410, c/o TELEPHONE ENGINEER.

WANTED: PLANT SUPERINTENDENT for a Class A Telephone Company in Ohio. The man we want must be trained in all phases of telephone plant and its construction; he should be able to engineer and develop his own plans and carry them through to completion. If you are not afraid to tackle a job full of responsibility, then write us giving full details as to your experience, age, education, availability, etc. Ours is a friendly, congenial organization that is going places and we have an attractive proposition for the man who measures up to our requirements. Reply Box 8409, c/o TELEPHONE ENGINEER.

For DEPENDABLE, RELIABLE SERVICE
Use AMCON AMERICAN TELEPHONE
and TELEGRAPH CONDENSERS
Specification sheets on request
AMERICAN CONDENSER COMPANY
4410 N. Ravenswood Avenue CHICAGO 40, ILLINOIS



SPLICER'S TOOLS

UNIQUE Of Top Quality by

- FURNACES
- SOLDER POTS
- BLOW TORCHES
- WIPING CLOTHS
- BALANCED LADLES
- SOLDER IRON HANDLES
- THAWING TORCHES
- FOLDING SAFETY SHIELDS

Protect Public, Cplicer, and Furnace. No. 50 C Shield shown here. Of 2 Ga. galvanized steel. Reinforced edges. 23"x17" x17". No. 50 — four-sided with grate. No. 50 A — same without grate.

Your Jobber Has These Tools

UNIQUE MANUFACTURING CO., INC
221 W. Walton St., Chicago 10, Ill.

Fluorescent Lighting Developments By Sylvania Electric Products

The first fluorescent Christmas tree lights now to be put on the market were developed by Sylvania Electric Products for the 1945 holiday season. Although made with the same type fluorescent powders that go into fluorescent tubes for regular residential and commercial use, the new lamps are small, round and need no special auxiliary equipment in order to operate.

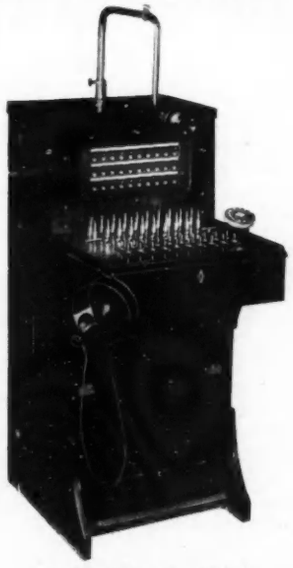
A fluorescent lighting devolpment is now in progress for new public vehicles of the New York City Transit System as a result of experiments conducted jointly by Sylvania Electric Products, Inc., New York City, and Communications Industries, Inc.

Reconstructed Equipment

Kellogg or W. E. 80 and 100 ohm drop coils @	$ .40
H. C. Motor Gen. Ringing machine @	40.00
Auto Elec. No. 510 A. O. Enclosed gong Steel signal sets with Booster Coil, Cond. and 1400 ohm ringer @	6.50
W. E. No. 229 or 329 Insulated Trans Complete with back @	1.25
Kellogg No. 22 L. or C. Trans Complete with back $1.35 less back @	1.25
Cook No. 8 or No. 10 Arresters with heat coils and carbons 20 line strip	8.00
Kellogg or W. E. New Composition Rec. Shells and caps @	.45
Kellogg, Dean, S. C. W. E. or Auto Mouthpieces @	.08
Stromberg Practically new 2 Cond. Swbd. Plugs. Fits No. 11 drops & Jack	.40
Western Elec. No. 27 Repeating coils Talk through type @	2.50
Western Elec. No. 22C Shutter type Code ringing type Combine line drops & jacks per strip of 5 @	15.00
New Kellogg, Stromberg, Monarch or Western Elec. Swbd. Plugs @	.70
Western No. 1001C All metal Hand sets with push Button switch hook in handle complete with 3 Cond. Cord @	5.00
Kellogg Practically New Lineman Test set with 4 Bar Gen. 1600 ohm ringer complete with batteries @	15.00

REBUILT ELECTRIC EQUIPMENT CO.
1704 West 21st Place
Pilsen Station, Chicago 8, Ill.

PBX SWITCHBOARDS



Ask For Circular 745-B

Buckeye Telephone & Supply Co.
COLUMBUS 6, OHIO

FOR SALE: Magneto telephone plant of 275 telephones and demand for more telephones. Good rates. Reason for selling on account of old age. Located in northeast Kansas. Write Box 8414, c/o TELEPHONE ENGINEER.

POSITION WANTED: Grad. Electrical Engineer with engineering and operating experience, recently experienced in all phases of original cost study and continuing property records desires connection with Class A Company to conduct cost study, set up C.P.R. in position with operating department. Write Box 8416, c/o TELEPHONE ENGINEER.

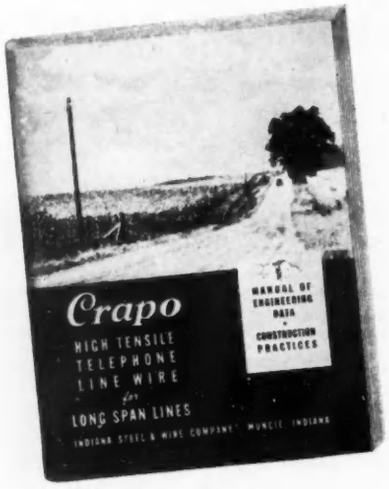
WANTED: Telephone Accountant—qualified to supervise all phases of telephone accounting for Class A companies. Give full information as to age, experience, draft status, etc. Attach small photograph. Telephone Services Inc., 16th Floor Lincoln Tower, Fort Wayne, Indiana.

HELP WANTED: Railroad Maintainers and Linemen, apply P. H. Wright, Supt. Communications, ACL RR., Savannah, Ga.

WANTED: Man trained in construction and maintenance. Company having three exchanges, 1500 station. Apply, giving qualifications. Citizens Telephone Company, Higginsville, Missouri.

WANTED TO BUY: Small telephone exchange with approximately 150 stations. Prefer Missouri or Illinois. Address Box 8417, c/o TELEPHONE ENGINEER.

How to Build Better Lines at Lower Cost . . .



Write for

This New Manual

- Engineering Data for Long-span, Low-cost Lines
- Tables of Stringing Sags
- Construction Practices
- Methods of Measuring Sags
- Pole Guying
- Metalicizing, Transposition
- River Crossings

Pertinent information on these and other subjects of timely interest to telephone men are contained in this new illustrated book.

It tells how to build better, more dependable rural lines; how to reduce construction and maintenance costs by employing *Crapo* High-Tensile Line Wire (*Crapo* HTL-135 or *Crapo* HTL-85) in long spans.

If you do not have a copy of this instructive Manual, be sure to ask for one! Direct your inquiry to your distributor of *Crapo* Galvanized Wire and Strand or write us!

Indiana Steel & Wire Company

▼

Muncie Indiana

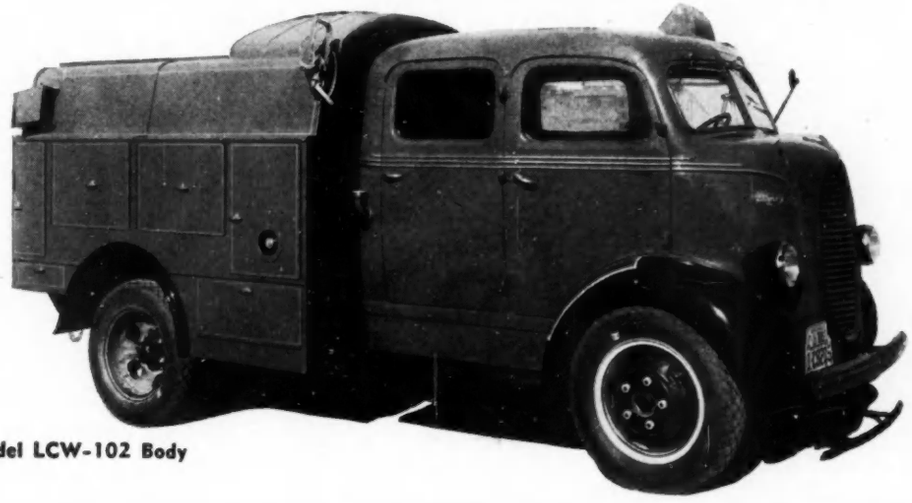
***Crapo* HIGH-TENSILE TELEPHONE LINE WIRE**

Index to Advertisers

Acme Visible Records, Inc. —
Acorn Insulated Wire Co. 74
American Coach & Body Co. —
American Condenser Co. 81
American Creosote Works —
American Creosoting Co. —
American Crossarm, Inc. 51
American Electrical Heater Co. 60
American Steel & Wire Co. —
American Tel. & Tel. Co. 22, 23
Anaconda Wire & Cable Co. —
Armstrong Cork Co., Whitall Tatum Glass Insulators Dept. 4, 51
Associated Tel. Engineers, Inc. —
Automatic Electric Co. 14, 42, 43
Automatic Electric Sales Corp. 60, 63, 79
Automatic Telephone & Elec. Co., Ltd. 9
Bartlett Mfg. Co. —
Benwood-Linze Co., The —
Berry & Co., L. M. 11
Bethlehem Steel Corp. 12
Brach Mfg. Co., L. S. 79
Buckeye Telephone & Supply Co. 65, 81
Buckingham Mfg. Co., W. H. 65
Cable Spinning Equipment Co. 6
Calculagraph Co. 24
Carney & Co., B. J. —
Carpenter Mfg. Co. —
Chance Co., A. B. 6, 78
Chisholm-Ryder Co., Inc. —
Churchill Cabinet Co. 54
Coffing Hoist Co. —
Colfax Lumber Creosoting Co. —
Collyer Insulated Wire Co. —
Commercial Cord & Supply Co. —
Communication Equipment & Engineering Co. —
Connecticut Tel. & Elec. Div. —
Cook Electric Co. 6, 41, 54
Cope, T. J., Inc. 4
Copperweld Steel Co. 57
Cullom & Ghertner —
Davison Chemical Corp. —
Dicke Tool Co. —
Dillon & Co., Inc., W. C. 49
Drake Electric Works, Inc. 20
D-X Products Co. 72
Eicor, Inc. 78
Electric Products Co., The —
Electric Storage Battery Co. 8
Ericsson Telephone Sales Corp. —
Estwing Mfg. —
Fansteel Metallurgical Co. —
Forged Steel Products Co. —
Four Wheel Drive Auto Co., Inc. —
G & W Electric Specialty Co. —
Gary Service & Investment Co. —
General Cable Corp. —
General Electric Co. —
General Insulated Wire Works, Inc. —
General Telephone Directory Co. —
Graybar Electric Co. 59
Gray Manufacturing Co. 46, 47
Great American Industries —
Hallicrafters Co. —
Hammond Drierite Co., W. A. —
Highway Trailer Co. 83
Hirsch Organization, Gustav. 20
Holtzer-Cabot Electric Co. —
Hubbard & Co. 63
Independent Telephone Inst. —
Indiana Steel & Wire Co. 6, 82
Industrial Screw & Supply Co. —
Industrial Instruments, Inc. —
International Harvester Co. 19
International Tel. & Tel. Corp. —
Joslyn Mfg. & Supply Co. —
Ka-Mo Tools, Inc. —
Kaufman, H. J. —
Kearney Corp., Jas. R. —
Kellogg Swichboard & Supply Co. 4, 5, 6, 7
Kester Solder Co. 5
Klein & Sons, Mathias 79
Koppers Company —
Leeds & Northrup —
Leich Sales Corp. 2, 3
Lenz Electric Mfg. Co. 73
Line Material Co. —
Littelfuse, Inc. —
Loomis Advertising Co. 77
Lorain Products Corp. 4, 74
MacGillis & Gibbs Co. 6, 80
Matthews Corp., W. N. —
Meredith Co., Inc., Wm. C. —
Michigan Pole and Tie Co. —
Miller, Mill Co. T. R., —
Mitchell, Jay G. 80
Moss Tie Co., T. J. 53
Murdock, Wm. J. —
National Carbon Co. —
National Electric Prod. Corp —
National Telephone Supply Co. 55, 67
Naugle Pole & Tie Corp. —
Newman Mfg. Co., Inc. 4
North Electric Mfg. Co. 84
Oliver Iron & Steel Corp. —
Overton, S. E. —
Owens-Illinois Glass Co. 7, 75
Page & Hill Co. 68
Paragon Electric Co. —
Phelps Dodge —
Philco Corp. 7, 13
Phillips Electrical Works, Ltd. —
Plastic Wire & Cable Corp. 52
Porcelain Products Inc. —
Porter, Inc., H. K. —
Premax Products —
Ray-O-Vac Co. —
Raytheon Mfg. Co. 4, 15
Rebuilt Electric Equipment Co. 81
Reliable Electric Co. 4, 21, 53
Roebling's Sons Co., John A. 18
Runzel Cord & Wire Co. —
Schauer Machine Co., The 55, 64
Seymour Smith & Sons, Inc. —
Sherron Metallic Corp. —
Sound Equipment Corp. —
Star Expansion Bolt Co. —
Stromberg-Carlson Co. 16, 17, 38, 39, 51, 53, 54, 55
Suttle Equipment Co. 72
Sylvania Electric Products, Inc. —
Syntron Company —
Taylor-Colquitt Co. —
Telephone Adv. Inst. —
Telephone Engineer Book Corp. 65
Telephone Repair & Supply Co. 80
Telephone Sales & Service Co. —
Templeton Kenly & Co., Ltd. —
Texas Creosoting Co. —
Thornton-Tandem Co. —
Tinnerman Products, Inc —
Toeppen, Manfred K. 80
U. C. Lite Mfg. Co. —
Union Carbide & Carbon Co. —
Unique Mfg. Co. 81
U. S. Motors Corp. —
U. S. Rubber Co. 45
U. S. Steel Corp. 67
Valentine Clark Corp. —
Vulcan Electric Co. —
Western Electric Co. 69
Whitney Blake Co. 61
Williams, Geo. E. 80
Woods, Merrill J. —
Wood Preserving Div. Koppers Co. —
Wray & Co., J. G. 80
York Hoover Body Corp. —

A MODEL OF EFFICIENCY

Convenient • Comfortable • Complete



Model LCW-102 Body

OTHER HIGHWAY LEADERS

Model L-12-C Winch

MODEL P-8-T POLE TRAILER

Model HB Boring Machine

HIGHWAY

Highway Line Construction and Maintenance Bodies are designed by utility engineers who know the value of utilizing space — of arranging compartments for the convenience of the crew and distributing the weight to aid in the performance and add to the life of the truck.

There's a lot of experience built into Highway bodies.

HIGHWAY TRAILER COMPANY

MANUFACTURERS OF

TRUCK TRAILERS AND BODIES • EARTH BORING MACHINES • WINCHES • OTHER PUBLIC UTILITY EQUIPMENT

General Offices

EDGERTON, WIS., U. S. A.

The new McBERTY AUTOMATIC TELEPHONE SYSTEM

48

WHY PLASTIC MATERIALS?

Modern plastic materials give us freedom from shrinkage, warping, and moisture absorption over the entire life expectancy of the switchboard.

The use of such plastic materials with high insulation values makes it possible for us to build a type of relay structure which is small and compact.

A high degree of precision can be attained in the fabrication of parts, unattainable in other manufacturing processes except at a high cost.

With uniform, high precision parts, it becomes possible to use the simplest form of assembly procedures.

The fixed positioning of all elements assures the correct and permanent relationship of contacts. Relay adjustment is largely eliminated in manufacture, and completely eliminated in the operation of the finished switchboard.

The availability of new plastic materials offers a continuing challenge to the engineers responsible for progressive development in the telephone industry.

The NORTH ELECTRIC MFG. COMPANY
Galion • Ohio